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LINNEAN SOCIETY OF LONDON.

Præcursores ad Floram Indicam: being Sketches of the Natural Families of Indian Plants, with Remarks on their Distribution, Structure, and Affinities. By J. D. Hooker, Esq., M.D., F.R.S. & L.S., and T. Thomson, Esq., M.D., F.R.S. & L.S.

[Read March 3rd, 1857.]

It is our intention to offer to the Linnean Society, from time to time, systematic sketches of the Natural Orders of Indian Plants, chiefly derived from a careful study of the materials upon which we have both been for many years engaged.

We have been induced to draw up the present papers for two reasons: first, because no satisfactory advance can be made in the general botany of India, at the present time, except by the study of the Indian Herbarium now deposited at Kew, whilst many years must elapse before an equally extensive and complete series of specimens can be elsewhere brought together; and secondly, because the careful collation of these with each other, and with the Hookerian herbarium at Kew (of which indeed they form a part), supplies us with a vast quantity of invaluable data in botany, which must otherwise remain for years unpublished.

It was indeed mainly the unprecedented extent and intrinsic value of the Indian collections placed at our disposal by Sir W. J. Hooker, coupled with a request from the President and Council of the British Association, that induced us to found a work upon them, designed to contain a complete account of the vegetation of India in all its aspects. The first volume of our 'Flora Indica' was printed in 1855, and we must refer to its introductory essay for a history of the rise and progress of Indian botany, and for details of the principal collections on which these sketches will be founded*. Being unable to continue that work at present, we venture to hope that a temporary substitute, giving such an account of what it should consist of, as the following pages supply, may be acceptable to our fellow-botanists.

The Præcursores are intended to be literally what their name implies: to ourselves they will be a synopsis of the materials placed in order for critical study, when we shall be able to continue the 'Flora Indica'; and they may further be regarded as *præmonenda* for our contemporaries or successors, who may be about to study Indian plants, and who will gather from them a tolerably correct idea of the nature and extent of any Natural Order they may undertake to study; besides a certain amount of definite botanical information on each, and many indications of researches to be undertaken and investigations to be followed up.

It is not easy to say how far sketches of this kind can be considered as exponents of the vegetation of a country so extensive as India, extending in elevation from the level of the sea to 18,000 feet, and in area from Malacca to Afghanistan, and from Ceylon to Tibet; and still less can they be guides to the writings of the numerous botanists whose labours on Indian plants are scattered over the whole field of botanical literature. Our own researches, it is needless to say, cannot be much extended beyond a careful comparison with the best authorities of the 12,000 species and 300,000 specimens which we have to examine and classify, and which must pass many times under our scrutiny during the progress of the arrangement of the great Herbaria from which we derive our materials. In the course of such an undertaking as this, though conducted with every precaution, under every advantage of books, the best-named Herbaria in Europe, and the constant revision and assistance of several distinguished botanists at Kew, so many mistakes must occur, that it is with great diffidence that we publish our first crude results in the present incomplete form. On the other hand, it is obvious that the collation of such Herbaria and books must yield at every stage of its progress a vast number of data regarding the distribution, structure, affinities, and nomenclature of Indian plants, which no other circumstances could elicit, and which no more detailed or critical investigations can afterwards subvert; and it is these which will give the chief, if not the whole, value to our sketches.

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* In addition to the collections there enumerated, we have to add the names of the following gentlemen who have contributed to Sir W. Hooker's very valuable materials for the 'Flora Indica': Dr. Ritchie of Bombay, an extensive collection from Concan and the Deccan, &c.; Dr. M'Clelland, a very large Pegu herbarium; the Rev. Mr. Foulkes, a considerable Peninsular collection; the Rev. Mr. Johnson, Cochin plants; Mr. Bartle Frere, Beloochistan plants. We have also to state that the whole of the late Dr. Stocks' collections have been incorporated with the duplicate Indian herbaria for distribution along with our own, and that we have to acknowledge the receipt of many valuable additional collections from Messrs. Edgeworth, Thwaites, Schmidt, Wight, and Law.

These data, if systematically collected and arranged, will assume the shape of a tolerably complete *catalogue raisonné* of the Flora of India, which will be most full and accurate as regards the number and distribution of the species, and least so as regards references and synonyms, and the limits of critical species*. In the process of collecting them, we should in many cases be enabled to form more correct estimates of the relative value of those morphological differences upon which natural orders and genera are founded, than we could by a closer study of fewer species or genera; and we should be enabled to appreciate the effects of exposure, elevation, temperature, humidity, and other external agents, in modifying the characters of organs, which escape observation in the detailed study of a few specimens from a few localities only.

It remains to say something of the plan of these Præcursores. They are intended to comprise catalogues of all the plants known to us in each Natural Order; and these, or groups of these, will be prefaced by some general remarks. Well-known species will, in most cases, be simply named, and only such synonyms and references added as appear worthy of notice, and are not to be found in DeCandolle's 'Prodromus,' and other works of standard authority in general use. We shall in many cases add as doubtful synonyms, names of plants which we have reason to think may be such, or which at any rate deserve a closer comparison than we can give. These references are, therefore, on no account to be considered as anything but suggestions. We shall give characters of new genera and species, with indications of their affinities; and we shall in some cases give monographs of imperfectly known genera. The localities will always be fully given, in accordance with the plan proposed in the 'Flora Indica,' and illustrated in the map of botanical provinces appended to that work. Following the habitats will be a brief guide to the extra-Indian distribution of the species.

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* At least in the opinion of those who regard the essence of specific botany to be the successful searching after differences, however minute, rather than estimating the value and significance of such differences, and tracing identity of plan and structure under diversities of aspect, form, and external conditions.

SERIES I. STYLIDIEÆ, GOODENOVIEÆ, ET CAMPANULACEÆ (including LOBELIACEÆ).

We commence these sketches with the Gamopetalous *Epigynæ*, from their having been recently under our examination, and not from any considerations connected with their position in the series of Dicotyledonous plants. Their title to rank high in that series will, however, be considered very strong by those who regard cohesion and adhesion of the floral whorls, and a great deviation from the typical leaf, in the organs of which these consist, as certain indications of high development in a plant.

Of the *Stylidieæ* and *Goodenovieæ* there are very few representatives in India, though the former order reaches its northern and western limits in that country; advancing to Silhet in N. lat. 25°, and as far west as Ceylon, and we believe also Orissa; for though we have seen no specimens, a species is reported by Griffith to have been found in that country. Of the three Indian *Stylidieæ*, none are the same as New Holland species; but one, the *Stylidium uliginosum*, is certainly also found at Hong Kong. Hitherto it has been detected in no part of India except Ceylon, but it is so very nearly allied to the *S. Kunthii* of the Malayan Peninsula, Chittagong and Silhet, that it may prove to be a variety of that plant.

The *Goodenovieæ* are represented by two very widely distributed and variable littoral species: one of these appears to be the *Scævola Plumieri* of the West Indies, and is also found on both coasts of tropical Africa and in the Galapagos Islands; the other is also a Mauritius and Madagascar species, but has a wider eastern distribution than *S. Plumieri*, being spread over the Malayan islands, and the tropical coasts of Australia and Polynesia; it has many names, and is the *S. Kœnigii*, Vahl, of which *S. sericea*, Forst., is only a state, with more copious silky hairs on the stem and in the axils of the leaves, than are ever found in the Indian plant.

Under *Campanulaceæ* we have included the *Lobeliaceæ* as a tribe, considering that they have no sufficient claims to rank as a separate order. It is true that the limits between these tribes are seldom disputed; but they are of very little value, and are founded on characters common to many species of both. The character most relied on is the connate anthers of *Lobeliaceæ*, but these are found in *Symphyandra* of *Campanulaceæ*, whilst various *Lobeliaceæ* have free anthers. Even the irregular corolla affords no good mark, for some states of the Australian *Wahlenbergia saxicola* have an oblique corolla, and unequal inclined anthers, of which two have the connective produced into an appendix, thus imitating a prevalent feature of *Lobeliaceæ*. In both tribes the fruit is either baccate or capsular, and in each the dehiscence takes place sometimes above and sometimes below the limb of the calyx.

The Indian *Lobeliaceæ* offer few structural peculiarities. We have, however, been obliged to found a new genus upon a remarkable and handsome species from the Sikkim Himalaya, identical with a mountain plant of Java, which we suppose to be the *Lobelia montana* of Blume.

The Indian *Campanuleæ* are a more extensive and very instructive tribe, and we have several remarkable forms to add to those which have been so well illustrated by Alphonse DeCandolle in his elaborate and able monograph. Of these novelties *Codonopsis* and its allies are the most anomalous, including as they do the beautiful genus *Cyananthus*, which, following Bentham, we unhesitatingly refer to this group, and which is indeed scarcely separable by technical characters from *Wahlenbergia* itself. In the 'Illustrations of Sikkim Himalayan Plants,' we figured the most remarkable Indian forms of *Codonopsis*, regarding several of them as subgenera, though founded upon extreme deviations from the prevalent arrangement of the floral whorls in *Campanulaceæ*. Our friend M. DeCandolle has since communicated to us by letter some valuable criticisms on the course we adopted; pointing out that some of the characters which we held to be of only subgeneric value, are of even ordinal value in other families of plants; and further, that if these subgenera are to be permanently considered as such, almost all the genera of *Campanulaceæ* may be merged into one. Of this we were perfectly aware, and indeed of more than this; namely, that the whole question of what should or should not constitute a genus, is involved in the consideration of the limits of such a group as *Codonopsis* and its allies; and although, in accordance with M. DeCandolle's views, we have now raised these subgenera to the rank of genera, we have by no means altered our opinion of their relationship, and still less of their structural peculiarities. Indeed we have little doubt that, could we undertake a revision of the whole Order, these and many other of the present genera would be reunited as subgenera of larger groups.

Upon this subject we take the liberty of reading a note on the principles upon which genera should be established in Botany, communicated to us by Mr. Bentham, who has kindly embodied the views which we hold in common with him, in a memorandum* appended to this communication.

The genera of *Campanulaceæ* are indeed, for the most part, quite artificial; and of this the best proof we can offer is to be found in the study of those already founded, and especially of the allies of *Codonopsis*. These include plants so nearly connected by natural characters of habit, colour, odour, and habitat, as well as by the structure of their flowers, that their close affinity has never been doubted; but some of them present more striking differences from one another, and more remarkable deviations from the common plan on which the Order is constructed, than any other plants in it. By far the greatest peculiarity is exhibited by *Campanumœa* and *Cyclocodon*, genera which present the paradox of a *calyx inferus* and a *corolla supera*. In *Cyclocodon* this anomaly is carried to the highest degree, the sepals being in *C. parviflorum* placed on the peduncle of the flower, far removed from the base of the corolla and ovary, whilst in *C. truncatum* and in *Campanumœa* they adhere to the base of the tube of the corolla. So remote from one another are the points of insertion of the calyx and corolla in both these instances, that the sepals have been described as leaflets of an involucre, though their development is opposed to this conclusion, and their æstivation is normally valvate. In *Codonopsis* the calyx is adherent to the base of the ovary, and the corolla is inserted at the point where the lobes of the calyx are given off: but so similar in other respects is one species of this genus to one of *Campanumœa*, that they can with difficulty be distinguished, except by a close comparison: and both these last-named genera again differ wholly from *Cyclocodon* in their ramification, large tuberous roots, twining stems, and fœtid milky juice.

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* See p. 30 of this volume.

Leptocodon is a third genus, containing one species, entirely agreeing with *Codonopsis* and *Campanumœa* in its habit, ramification, and fœtid juice, and with the former genus in the structure and adhesions of its calyx, corolla, &c., but having five staminodia alternating with its stamens, and few ovules fixed to placentæ which are not in the axis of the cells of the ovary, but on the walls of the dissepiments.

Turning to the fruit of these genera, we usually find in *Codonopsis* a membranous or baccate fruit, bursting by three horny valves within the base of the corolla; but in *C. inflata* these valves appear to be obliterated, and the fleshy berry scatters its seeds by decay of its walls, like that of *Campanumœa* and *Cyclocodon.*

In dividing these difficult *Campanulaceæ* into genera, M. DeCandolle has laid much stress on the relation of the cells of the ovary to the calyx-lobes; but these, being rarely equal in number, are seldom available for technical characters. In *Campanumœa,* the sepals alternate with the ovarian cells; in *Cyclocodon,* they are opposite; in *Codonopsis rotundifolia* (when 5-celled), they are normally opposite, I believe, though I find some observations recording the contrary amongst my notes on the live plant.

Thus in keeping up the four genera, *Campanumœa, Codonopsis, Leptocodon,* and *Cyclocodon,* we find ourselves obliged to go beyond M. DeCandolle, who, in his last revision of the *Campanulaceæ* (Prodr. vol. vii.), places all the species of *Codonopsis,* as restricted by us, in *Wahlenbergia,* and retains the name *Codonopsis* for Wallich's *C. truncata* and *C. parviflora,* also keeping up Blume's genus *Campanumœa.* But as one of his species of *Campanumœa* is identical with *Codonopsis parviflora,* Wall., and the typical species of *Codonopsis* differ from *Wahlenbergia,* it is necessary to remodel all these genera. In the mean time, considering the present state of the genera of *Campanulaceæ,* we have thought it better to adopt M. DeCandolle's opinion, and raise the subgenera of *Codonopsis* to the rank of genera.

The only other important observation to which we would call attention, is the presence in the same individual of some species of *Campanula* of two forms of flowers, differing remarkably, not only in size and appearance, but in structure; of these one kind is normal, the other very minute, generally on very long and more slender pedicels, with a more globose ovary, differently formed (often more foliaceous) sepals, and no corolla or stamens. These dimorphous flowers sometimes occur on the same plant; at others, individual plants will present only one form of flower. Such species are of course polygamous, and in some cases the two forms would at first sight be referred to different divisions of the genus, and have indeed been described as different species by our predecessors. The small flowers appear, and arrive at maturity, contemporaneously with the large, and like them produce abundance of seeds. So far as we are aware, this singularity is confined to the Indian species, for we have failed to detect it in the Persian ones that are nearly allied to the Indian, or in any others, though we have searched for them with some care throughout the extra-Indian species. Though unnoticed, we believe, by any naturalist, this dimorphism is a very prevalent character of several species, both tropical and temperate, including the most common of all (*C. canescens*, Wall.).

Nat. Ord. STYLIDIEÆ.

1. *Stylidium Kunthii*, Wall. An var. *S. uliginosi*?

Hab. Arenosis Bengaliæ orientalis; Silhet! *Wallich*, &c., et Chittagong! necnon in Peninsulâ Malayanâ ad Mergui! *Griffith* (fl. temp. frigid.) (v. v.)

2. *Stylidium uliginosum*, Swartz.

Hab. Insulâ Ceylon! *Walker, Champion.—Distr.* Chinâ meridionali ad Hong Kong.

3. *Stylidium tenellum*, Swartz.

Hab. Peninsulâ Malayanâ ad Malacca! et Mergui! *Griffith.*

Nat. Ord. GOODENOVIEÆ.

1. *Scævola Kœnigii*, Vahl.—*S. Bela Mogadam*, R. & S.—*S. Lambertiana*, de Vriese.—*S. chlorantha*, de Vriese.—*S. Taccada*, Roxb.—*S. sericea*, Forst. est varietas ramulis, axillis, &c. barbatis.

Hab. Littoribus oceani ad Ceylon! *Champion*; Martaban! Concan! et Scinde! *Dalzell, Stocks*, &c. necnon in Peninsulâ Malayanâ! *Wallich*, &c.—*Distr.* China! ins. Oceani Indici! et Pacifici! Mauritius! et Madagascar!

2. *Scævola Plumieri*, Vahl.—*S. Thunbergii*, Eckl. & Zeyh.—*S. uvifera*, Stocks (Wight, Ic. 1613).—*S. Senegalensis*, Presl.

Hab. Littoribus oceani ad Ceylon! *Herb. Thwaites*, 1777; Malabar et Scinde! *Vicary & Stocks.—Distr.* Africa tropica! India occidentalis! et in insulis Galapagœis!

Nat. Ord. CAMPANULACEÆ.

Tribe I. CAMPANULEÆ.

Gen. I. CEPHALOSTIGMA.

1. ***Cephalostigma paniculatum,*** **A. D.C.**
Hab. Birmâ ad Prome! *Wallich.*

2. *Cephalostigma hirsutum,* Edgew. in Linn. Trans. xx. p. 81.—*C. Schimperi,* Hochst. Plant. Abyss. 69.—*Wahlenbergia perotifolia,* W. & A., Wight, Ic. 842.
Hab. Collibus siccis Himalayæ occidentalis; Kumaon! *Strachey & Winterbottom*; montium Khasia! (alt. 4000 ped.) et Peninsulæ! *Wight, Stocks, Law, Dalzell,* &c. (fl. Sept.) (v. v.)—*Distr.* Abyssinia.

3. CEPHALOSTIGMA FLEXUOSUM, Hf. & T. Caulibus hispido-pilosis simpliciusculis gracillimis flexuosis superne paniculatim ramosis, ramis filiformibus, foliis sessilibus late ovato-oblongis obtusis subsinuato-dentatis supra glaberrimis subtus secus costam et nervos sparse pilosis, floribus gracile-pedicellatis, calycis tubo late hemisphærico lobisque hispidis, corollæ profunde 5-fidæ lobis lineari-oblongis calycem paulo superantibus, filamentis basi rhombeis ciliatis, stylo exserto, stigmate capitato 3-lobo.
Hab. Concan! *Dalzell, Stocks.*
Herba 5–8 uncialis, caule angulato; *folia* $\frac{3}{4}$ unc. longa, interdum in petiolum brevem angustata, marginibus glabris ciliatisve.—*C. hirsuto,* Edgew., accedit, sed differt conspicue caule graciliore flexuoso, foliis multoties latioribus non undulatis, pedicellis longioribus, calyceque setis longis rigidis hispidulo.

Gen. II. CAMPANUMŒA, *Blume.*

Calyx inferus; *sepala* 5 basi ovarii adherentia, patentia. *Corolla* supera, campanulata, breviter 5-loba. *Stamina* 5, libera, filamentis filiformibus basi subdilatatis; antheris oblongis. *Discus* epigynus depressus, obscure lobatus. *Ovarium* depresso-globosum, 5-loculare, basi 5-costatum; loculis multiovulatis, ovulis multiseriatis placentis crassis axillaribus adnatis; *stigma* clavatum, 5-lobum, lobis valvatis extus dense pilosis. *Fructus* membranaceus v. subbaccatus, indehiscens, irregulariter ruptus. *Semina* minima, oblonga.—Herbæ *succo lacteo scatentes*; radice *magno, tuberoso*; caule *volubili*; foliis *alternis, oppositis, subverticillatisve*; floribus *axillaribus* v. *terminalibus.*

1. CAMPANUMŒA JAVANICA (*Blume, Bijd.* 726). Glaberrima, scandens, foliis oppositis cordatis acutis subcrenatis subtus glaucis, sepalis basi ovarii adnatis, floribus pentameris.—*Alph. D.C. Monog.* 119.

et in D.C. Prodr. vii. 423. Codonopsis, § Campanumœa Javanica, *Hf. & T. in Ill. Himal. Plants*, t. xvi. B.

Hab. In Himalayâ orientali temperatâ, alt. 5000–6000 ped. Sikkim! *J. D. H.* In montibus Khasia, alt. 4000–6000 ped. graminosis! *Griffith, Hf. & T.* (fl. Jul.) (v. v.)—*Distr.* Java! *Blume, Lobb.*

Caules graciles, volubiles. *Folia* 1–2 pollicaria, basi cordata v. biloba, sinu lato interdum ad insertionem petioli dilatato, acuta v. subobtusa, crenata rarius integerrima, membranacea, superne pallide viridia; petiolo ½–¾ longit. laminæ. *Flores* solitarii, ¾–1½ poll. longi, axillares, virescentes; pedicellis petiolo æquilongis longioribusve. *Calyx* in alabastro magnus, vacuus, basi florem parvum gerens. *Sepala* basi ovarii adnata, ovato-lanceolata v. ovato-oblonga v. linearia, obtusa v. acuta, magnitudine varia, plerumque ¼–⅓ longit. corollæ, post anthesim crescentia. *Corolla* supera, breviter tubuloso-campanulata, basi lata obscure 5-angulata, lobis vix patentibus late ovatis apicibus acutis papillosis. *Filamenta* lineari-subulata, glabra, basi vix dilatata. *Antheræ* lineares, connectivo apiculatæ. *Stylus* columnaris, teres, glaber, apice obconico pubescente in ramos stigmaticos late oblongos revolutos dilatatus. *Ovarium* late hemisphæricum, obscure 10-costatum, 5-loculare; loculis sepalis alternantibus. *Bacca* pulposa v. submembranacea, purpurea, calyce persistente sæpissime aucto suffulta, ½–1 un. diametro, 5-locularis, evalvis; semina placentis latis axillaribus multiseriatim affixa, oblonga, sessilia. *Testa* coriaceo-crustacea, areolis suborbiculatis minute tessellata, exemplaribus perplurimis ab omnibus patriis examinatis vacua!—Odor vix ullus, graveolens.

The flowers vary extremely in size, the calyx-lobes in proportionate size to corolla and in shape, and they further continue growing after the corolla withers. *Berry* purple or green, walls fleshy or membranous.

2. Campanumœa lanceolata (*Sieb. & Zucc. Flor. Jap.* i. 174. t. 91). Caule volubili, foliis alternis v. subfasciculatis breviter petiolatis oblongo-lanceolatis utrinque attenuatis acutis integerrimis glabris subtus glaucescentibus, floribus terminalibus solitariis, calyce imo basi ovarii adnato.—Campanumœa lanceolata, *Planch. in Flore des Serres*, t. 927; "*Fl. Jap.* l. c." Tsuru ninzin, *Thunb. Fl. Jap., Plant. obscuræ*, n. 21. p. 353.

Hab. Chinâ, fide *Siebold*, in Japoniâ culta, *Siebold.*

Radix tuberosa, crassa, fere ut in *Panace quinquefolio* (unde nomen Jap. vern. Ninzin). *Caulis* 2–3 pedalis, glaber, purpurascens. *Folia* in caule alterna, in ramulis approximata, breviter petiolata, 1–2 unc. longa, integerrima v. irregulariter et remote crenulata, reticulatim venosa. *Flores* in apice ramulorum abbreviatorum in racemum brevem simplicem bracteolis parvis lanceolatis munitum dispositi, plerique abortivi, pedunculo tereti erecto. *Calyx* ovario basi adnatus, ceterum liber; tubus hemisphæricus, extus 10-sulcatus, glaber, limbus

5-partitus, laciniis ovato-lanceolatis integerrimis, corolla ½ brevioribus. *Corolla* perigyna, magnitudine *Campanulæ Trachelii*; extus pallide lilacina, intus hepatico-violacea, glabra; limbi laciniis ovato-deltoideis acutis tenuissime papilloso-ciliatis. *Discus* 4-angularis, carnosus, glaber, olivaceus. *Stamina* 5, libera; filamentis longitudine tubi corollæ. Antheræ 4 (?)- loculares, 4 (?)- valves. *Ovarium* 3-loculare. *Stylus* longitudine staminum, a medio apicem versus dense papillosum. *Stigma* incrassatum, infundibuliforme, 3-lobum.

The above description is abridged from Siebold and Zuccarini's beautiful work; those writers describe the root as sweet with an after bitter taste, and add, that it is considered an efficacious remedy in complaints of the chest and chronic affections of the lungs. We have queried the description of the anthers, which are said to be 4-locular, probably being a clerical error for 2-locular, as they appear to be in the plate, and in that given in the 'Flore des Serres.'

Gen. III. CODONOPSIS, *Wall.*

Calyx superus, 5-lobus. *Corolla* tubulosa v. campanulata, 4–6-loba. *Stamina* 4–6, libera; filamentis basi subdilatatis filiformibus; antheris oblongis. *Discus* epigynus carnosus, depressus, obscure lobatus. *Ovarium* costatum, globosum v. obconicum, pars superior truncata v. conica, in stylum rectum attenuatum, 3–5-loculare, loculis multiovulatis; *ovulis* multiseriatis, placentis crassis axillaribus adnatis. *Stigma* clavatum, 3–5-lobum, lobis valvatis intus planis extus dense pilosis, sub anthesim recurvis. *Fructus* pars infra corollam baccata indehiscens v. irregulariter rupta, pars superior conica coriacea v. cornea, 3–5 valvis. *Semina* oblonga, testa crustacea v. coriacea, lævia v. reticulata; albumine copioso carnoso; embryone tereti.—Herbæ *volubiles v. suberecti; succo lacteo v. aqueo, sæpissime fœtido; glaberrimæ v. pilosæ;* caulibus *simplicibus v. ramosis;* foliis *oppositis alternisve*; floribus *sæpius magnis, terminalibus, axillaribus, oppositifoliis v. extra-axillaribus, cernuis pendulisve.* Corolla *membranacea v. subherbacea, cærulea, virescens v. sordide alba, purpureo-variegata et venosa, lobis brevibus, papilloso-ciliatis.* Pollen *globosum, læve v. muricatum.* Ovarii *loculi dum numero sepalis æquales iis oppositi vel alterni; dum pauciores oppositi et alterni;* stigmatis *lobis loculis ovarii oppositis, extus et basi dense pilosis, pilis basi papillis cellulosis insidentibus;* ovulis *anatropis, integumentis cum nucleo conferruminatis.*

1. **Codonopsis viridis** (*Wall. in Roxb. Fl. Ind.* ii. 103). Volubilis, ramis glabris, ramulis foliisque præsertim subtus canis cano-tomentosisve, foliis oppositis alternisque ovatis oblongis ovato-lanceolatisve acutis acuminatisve, pedicellis axillaribus et oppositifoliis, calyce pubescente lobis augustis, ovario hemisphærico, corolla late campanulata, bacca depresso-globosa apice conica, valvis 3–5 corneis.—*Wall. Cat.* 1298; *Alph. D.C. Mon. Camp.* 120. Wahlenbergia viridis, *A.D.C. Prodr.* vii. 425. Campanula viridis, *Spreng. Cur. Port.* 78. Codonopsis 2 & 3, t. 372, *Griff. Not.* iv. 280, 281.

Hab. In sylvis temperatis Himalayæ; Nipal! *Wall.*; Kumaon, alt. 7000 ped.! *Blinkworth, Madden*; Montibus Khasia, alt. 5000–6000 ped.! graminosis, *Griffith*, &c. (fl. Sept.) (v. v.)

Fœtida. *Rami* debiles, glabri, nitidi, ramulis pubescentibus villosisve. *Folia* opposita et alterna, glabrata v. cano-pubescentia v. in exemplaribus Khasianis cano-tomentosa, petiolo gracili ½-1 pollicari, lamina latitudine varia, 2–4 unciali, membranacea, basi rotundata rarius cordata, apice acuta v. acuminata, margine integerrima v. obscure crenato-dentata. Flores magnitudine variabiles. *Calycis* tubus late hemisphæricus, *lobis* distantibus, linearibus, patentibus, integerrimis v. subdentatis. *Corolla* ½ unc. longa, late cylindraceo-campanulata, lobis brevibus, late ovatis, acutis, glaberrima v. puberula, plerumque pallide viridis, intus basi purpurascens, lobis venosis apicibus rubris. *Bacca* ½-1 unc. lata, carnosula, valvis corneis. *Semina* pallide fusca v. sordide flavida; testa reticulata.

The Khasia Mountain specimens are usually more downy than the Himalayan ones, the leaves being sometimes almost villous on both surfaces, but we find no other difference between them and the Kumaon specimens; the latter are sometimes almost glabrous.

2. **Codonopsis affinis** (*Hf. & T.*). Volubilis, ramis glabris, ramulis ultimis puberulis, foliis ovato-cordatis basi profunde bilobis superne glabris subtus cano-pubescentibus, pedunculis oppositifoliis, calycis tubo hemisphærico lobis lineari-oblongis lanceolatisve puberulis, corolla late cylindraceo-campanulata, fructu ut in *C. viridi.*

Hab. In sylvis et fruticetis temperatis Himalayæ orientalis; Sikkim vallibus Lachen et Lachung, alt. 6000–9000 ped.! *J. D. H.* (fl. Aug.) (v. v.)

C. viridi simillima, sed foliis brevius petiolatis magis coriaceis et semper basi profunde bilobo-cordatis, lobis rotundatis, sinu clauso v. aperto. *Flores* virescentes, apicibus loborum corollæ rubris. *Calycis* lobi latiores quam in *C. viridi.*

3. **Codonopsis purpurea** (*Wall. in Roxb. Fl. Ind.* ii. 105). Glaberrima, caule scandente fragili nodis incrassatis, foliis oppositis breve petiolatis lanceolatis ovatis ovato-lanceolatisve acutis basi subacutis membranaceis subtus glaucis, pedicellis terminalibus axillaribus

oppositifoliisque petiolis multoties longioribus, calycis tubo conico, lobis late ovato-lanceolatis acutis corolla late cylindracea dimidio brevioribus.—*Wall. Cat.* 1299! *Alph. D.C. l. c.* 121. Wahlenbergia purpurea, *Alph. D.C. Prodr.* vii. 425. Campanula purpurea, *Spr. Cur. Port.* 78.

Hab. In Himalayâ temperatâ centrali, Nipal! *Wallich.* Kumaon, alt. 6000 ped.! *Strachey & Winterbottom* (fl. æstate).

Herba ut videtur scandens, sed vix volubilis. *Caulis* glaberrimus, nitidus, fragilis, ad nodos incrassatus, sed vix articulatus. *Folia* 1–3 unc. longa, ½–1½ lata, membranacea, integerrima v. leviter subcrenulata, basi acuta v. subrotundata, apice acuta v. acuminata, subtus glauca; petioli ¼–⅓ unc. longi. *Pedicelli* validi suberecti, plerumque oppositifolii, rarius terminales, pollicares. *Calycis* tubus glaberrimus, late obconicus, lobis ½–⅓ unc. longis. *Corolla* purpurea, 1 unc. longa.

This species appears, from the dried specimens we have examined, and which are all rather poor, to be hardly a twiner to the same extent as the other species of this section are. The leaves are almost constantly opposite, except where one is replaced by a peduncle. The stems are very shining and brittle, the leaves membranous and flowers large. It cannot be confounded with any other.

4. CODONOPSIS INFLATA (*Hf. & T. Ill. of Him. Plants*, t. xvi. c.). Glaberrima, volubilis, foliis alternis ovatis triangulari-ovatisve acuminatis basi late v. profunde cordato-bilobis sinu lato v. angusto, pedunculis oppositifoliis v. supra-axillaribus, calycis tubo obconico angulato lobis late ovato-oblongis acutis, corolla ventricoso-cylindracea ampullacea infra lobos breves contracta, bacca carnosa angulata sulcata apice 3-valvi, valvis brevibus corneis.

Hab. In sylvis et fruticetis Himalayæ temperatæ orientalis. Sikkim, montibus exterioribus alt. 5000–6000 ped.! (fl. Aug.) (v. v.)

Caules 8–10 pedales, ramosi, glaberrimi, novelli puberuli. *Petioli* graciles, 1–1½ pollicares. *Folia* majuscula, 2–4 uncialia, exacte ovato-cordata v. triangulari-ovata, acuminata, integerrima v. rarius crenulata, subtus glaucescentia, basi late v. profunde cordata, lobis rotundatis patentibus conniventibus. *Pedunculi* interdum cum caule longe connati hinc supra-axillares v. oppositifolii, petiolis subæquilongi. *Flores* magni, pallide sordide flavi, purpureo-venosi, et interdum rubro pallide suffusi. *Calycis* tubus 8–10 sulcatus et angulatus, lobis latis foliaceis patentibus. *Corolla* pollicaris. *Bacca* purpurea, glauca, carnosa, sulcata et angulata, late oblongo-obconica v. subcylindracea, truncata, apice breviter 3-valvi, valvis parvis corneis; interdum ut videtur omnino carnosa et indehiscens, magnitudine et forma variabilis, ½–1¼ unc. longa. *Semina* oblonga; testa sordide fulva, reticulata.

5. Codonopsis rotundifolia (*Benth. in Royle, Ill. Bot. Him.* 254. t. 62). Caule volubili piloso, foliis gracile petiolatis ovatis rotundatisve obtusis v. acutis basi rotundatis cordatisve grosse crenatis, pedunculis oppositifoliis petiolis longioribus interdum subterminalibus, calycis tubo angulato et sulcato lobis magnis foliaceis, corolla late campanulata breviter 5-loba, bacca carnosa apice valvis 3 corneis conicis dehiscente.—*Hook. in Bot. Mag.* t. 4942. C. lurida, *Lindley*. Wahlenbergia rotundifolia, *Alph. D.C. Prodr.* vii. 425.

Hab. In sylvis et fruticetis Himalayæ temperatæ occidentalis; Kumaon! *Royle*; alt. 10,000 ped.! *Strachey & Winterbottom*; Kulu! 6000–7000 ped.! *Edgeworth*; Kishtwar, 8000 ped.! *T. T.* (v. v.)

Caulis patentim pilosus v. glabratus, nitidus. *Folia* opposita et alterna, 2–4 unc. longa, membranacea, glaberrima v. parce pilosa. *Pedunculi* plerumque oppositifolii, rarius ob ramulum lateralem abbreviatum quasi terminales, petiolis plerumque longiores, validi. *Flores* majusculi, ⅔–1 unc. longi. *Calycis* tubus basi rotundatus; lobis amplis, membranaceis, obtusis v. acutis, crenatis integerrimisve, corolla paulo brevioribus. *Corolla* sordide cærulescens v. virescenti-albida, colore varia, late cylindraceo-campanulata. *Bacca* ut in congeneribus forma et diametro varia, sulcata, subcylindraceo-obconica v. subglobosa, purpurea, carnosa, apice valvis 3 corneis longitudine variis dehiscens. *Semina* sordide flava, testa reticulata.

The broad foliaceous calyx-lobes at once distinguish this species from any except *C. Benthami*. The peduncles never seem to be terminal in the same sense as they are in the following section, but are generally manifestly opposite the leaves, or attached to the stem below them; that of the upper flower is however so much stouter than the branch beyond it, as to approach in appearance a terminal inflorescence. Royle's cultivated specimens seem to be quite glabrous, and Strachey and Winterbottom's are almost so too. Thomson's and Edgeworth's are more pilose. The fruit is extremely variable in size and form. The specific name is a bad one, some specimens bearing ovate leaves on the same individual with the rounded ones, and in others they are all ovate-cordate. The species is cultivated at Kew, both in the open air and in a cool greenhouse; in the latter the plants are always paler and more membranous, with broader leaves and larger flowers.

6. Codonopsis Benthami (*Hf. & T.*). Caule volubili ramoso rarius puberulo, foliis (rarius subopposítis) petiolatis ovatis ovato-lanceolatisve acutis grosse obtuse serratis basi acuminatis rotundatisve parce pubescentibus glabratisve subtus pallidioribus, pedunculis terminalibus, calycis tubo 5-costato lobis ovatis lanceolatisve acuminatis ciliatis

subserratis, corollæ cylindraceæ limbo erecto breviter 5-lobo, bacca carnosa apice valvis 3 dehiscente.

Hab. In sylvis et fruticetis Himalayæ orientalis temperatæ, Sikkim, alt. 9000–11,000 ped.! (fl. Jul.) (v. v.)

C. rotundifoliæ proxima; differt caule robustiore, foliis majoribus et angustioribus acuminatis nunquam patentim pilosis, floribus terminalibus, corolla tubulosa longiore et angustiore.

We were for some time inclined to consider this as an Eastern form of the Western *C. rotundifolia*, but cannot venture to unite them. The plant has a very heavy, rank, almost hircine smell when fresh.

7. Codonopsis ovata (*Benth. in Royle, Ill. Bot. Him.* 253. t. 69. f. 3). Caule ramoso ascendente pubescenti-piloso pilis reflexis, foliis breve (v. longius) petiolatis ovatis ovato-cordatis lanceolatisve pubescentibus inferioribus et ramorum sterilium oppositis, pedunculo terminali valido erecto 1–3-floro superne nudo v. parce foliato, calycis tubo obconico-hemisphærico, lobis ovatis acutis pilosis corolla ampla cylindracea apice 5-loba $\frac{1}{3}$–$\frac{1}{4}$ brevioribus, stigmate dilatato, capsula utrinque conica basi coriacea apice valvis 3 elongatis corneis.—*Lindl. in Gard. Chron.* 1856, p. 468. cum xylog. Wahlenbergia Roylei, *A. D.C. Prodr.* vii. 425. W. clematidea, *Schrenk. En. Pl. Soong.* v. 38.

Var. *β. ramosissima,* foliis flaccidis gracile petiolatis.

Hab. In sylvis et fruticetis Himalayæ boreali-occidentalis temperatæ, Kashmir! Herb. *Royle.* In Tibetiâ occidentali, Ladak! et Piti! alt. 9000–11,000 ped., *T. T.*; Afghanistan! *Griffith,* var. *β.* Baltal, Kashmir, alt. 9500 ped.! *T.T.* (fl. August.) (v. v.)—*Distr.* Soongaria!

Species annua?, fœtida, odore hircino, variabilis, 1–3-pedalis, e basi ramosa. *Caules* ascendentes, sæpe ramulosi, in pedunculos validos erectos apice curvos desinentes, ramulis plerumque non florentibus foliis minoribus oppositis alternisve onustis: pubes omnibus partibus brevis, densus v. laxus, pilis patulis vel sæpius deflexis immixtus. *Folia* subsessilia v. petiolata $\frac{1}{2}$–1$\frac{1}{2}$ unc. longa, plerumque $\frac{1}{3}$–$\frac{2}{3}$ pollicaria, acuta, integerrima, submembranacea, basi rotundata v. cordata v. acuta; in exemplaribus Tibeticis minora, densius pubescentia; in locis humidioribus membranacea majora. *Pedunculi* 1–3-flori. *Flores* cernui v. nutantes, ampli, pallide cærulei, $\frac{2}{3}$–1$\frac{1}{4}$ unc. longi. *Corolla* breviter 5-loba. *Stigma* amplum, dilatatum, cupulæforme, 3-lobum, lobis erectis, extus densissime villosum. *Capsula* $\frac{3}{4}$ unc. longa, erecta, basi brevi-obconica, valvis 3 elongatis corneis. *Semina* lineari-oblonga, testa nitida flavo-brunnea.

The Kashmir specimens are much larger, more flaccid, branched, and have more slender petioles than the Tibetan ones: these differences are without doubt due to climate. Griffith's specimens have some of the leaves narrower than any of the Himalayan or Tibetan ones.

8. Codonopsis subsimplex (*Hf. & T.*). Parce pilosa v. subpubescens, caule ascendente simplici v. e basi ramoso parce foliato, foliis petiolatis ovatis lanceolatis cordatisve crenatis, subtus glaucis, pedunculis terminalibus gracilibus 1–3 floris, pedicellis nudis v. 1–2-foliatis, calycis tubo hemisphærico lobis majusculis ovato-lanceolatis acuminatis corollam brevem late cylindraceam 5-lobam æquantibus, capsula breviter depresso-obconica, apice breviter 3-valvi.

Hab. In vallibus interioribus Himalayæ orientalis temperatæ. Sikkim, alt. 12,000–13,000 ped.! (fl. Jul.), (v. v.)

Herba glabriuscula, 1–2-pedalis; *caules* basi ramulos breves foliaceos emittentes, deinde ascendentes graciles simplices, in axillis foliorum ramulos abbreviatos bifoliatos gerentes. *Folia* sparsa, alterna, membranacea, ½–2 unc. longa, grosse inæqualiter crenata, acuta, acuminata v. obtusa, petiolo gracili ¼–¾ unc. longo. *Pedunculus* seu caulis apex simplex v. bis terve divisus. *Flores* nutantes v. cernui, pallide sordide cærulei, ¾ unc. longi, æquilaterales. *Calycis* lobi integerrimi v. subcrenati.

This is a much less branched plant than *C. ovata*, almost glabrous, with fewer, more membranous, larger, crenate leaves, much shorter flowers with larger (relatively) calyx-lobes, almost as long as the corolla, and a very broad depressed capsule with short horny valves. We have not, however, seen perfectly mature fruit.

9. Codonopsis thalictrifolia (*Wall. in Roxb. Flor. Ind.* xi. 106). Pubescens, caule ascendente basi ramulos plurimos breves foliosos graciles emittente superne in pedunculum longe nudum 1–2-florum desinente, foliis parvis oppositis alternisque pubescentibus petiolatis ovatis late cordatisve acutis obtusisve integerrimis v. obscure crenatis, calycis tubo late hemisphærico v. obconico lobis oblongis obtusis, corolla tubulosa cylindracea breviter 5-loba calyce 3-plo longiore, antheris mucronulatis extus villosis, stigmate dilatato, capsula basi late hemisphærica valvis 3 elongatis corneis.—*Benth. in Royl. Ill. Plant. Himal.* 253. Glossocomia thalictrifolia, *Wall. Cat.* 1297. G. tenera, *Don, Prodr. Fl. Nep.* 158. Wahlenbergia thalictrifolia, *Alph. D.C. Prodr.* vii. 425; Campanula thalictrifolia, *Spreng. Cur. Post.* 77.

Hab. In regione alpinâ Himalayæ centralis, Nipal! *Wallich.*

Herba ut videtur annua, spithamæa v. pedalis. *Caulis* ascendens, fructiferus robustus. *Rami* tenelli, breviusculi, foliosi. *Folia* ⅙–⅓ unc. longa, parce v. dense pubescentia. *Pedunculus* (seu apex caulis) longe nudus, 1–3-florus. *Flores* pro ratione plantæ magni, 1–1⅓ pollicares, pallide sordide cærulei. *Calycis* lobi ¼–⅛ unc. longi, acuti v. obtusi, interdum dentati. *Corolla* latitudine varia, ⅔ unc. diametr. *Fructus* ½ unc. longus. *Semina* ut in *C. ovata* et *subsimplici.*

10. Codonopsis fœtens (*Hf. & T.*). Pubescens, caule ascendente brevi e basi ramoso superne in pedunculum longe nudum 1–2-florum desinente, foliis parvis oppositis alternisque petiolatis pubescentibus

ovatis v. late cordatis integerrimis v. subcrenatis, calycis tubo late hemisphærico, lobis oblongis, corolla late campanulata, antheris glabris, capsula valvis 3 elongatis corneis :—an var. *C. thalictrifoliæ*?

Hab. In regione alpinâ Himalayæ orientalis, Sikkim, alt. 14,000–16,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

C. thalictrifoliæ proxima, et forsan ejus forma, sed exemplaribus nostris numerosissimis, corolla multoties latior fere longitudini æquilateralis, profundius lobata, magis coriacea.

Gen. IV. Leptocodon.

Calycis tubus medio ovarii adhærens, lobis 5 patentibus. *Corolla* tubuloso-campanulata, breviter 5-loba. *Stamina* 5, glandulis totidem epigynis erectis alternantia. *Ovarium* 3-loculare, ovulis placentis septis ovarii adnatis uniseriatim affixis. *Stylus* erectus. *Stigma* clavatum, 3-lobum. *Fructus* pars infra calycis lobos coriacea, obconica; pars superior elongato-conica, cornea, 3-valvis. *Semina* pauca, lineari-oblonga, testa atra, nitida, crustacea.—Herba *lactescens, tenerrima, volubilis, ramosa;* ramis *ramulisque fragillimis, gracilibus, dense intertextis;* foliis *oppositis alternisque, petiolatis, flaccidis, grosse crenato-lobatis;* pedicellis *gracillimis, plerumque extra-alaribus;* floribus *pendulis, dilute cæruleis;* calycis *lobis obovatis subdentatis.*

1. Leptocodon gracilis, *Hf. & T.* (Codonopsis, § Leptocodon gracilis, *nob. in Ill. Sikkim Himal. Plants,* t. xvi. A.)

Hab. In sylvis temperatis humidis Himalayæ orientalis, Sikkim! et Nepal Orient.! alt. 5000–7000 ped., *J. D. H.* (fl. Maio). (v. v.)

Planta pulcherrima, flaccida, cito evanescens, fœtidissima. *Caules* ramique dense intertexti. *Folia* $\frac{2}{3}$–1 unc. longa, petiolo fere æquilongo, pallide viridia, subtus glauca. *Calyx* semisuperus, lobis basi remotis, parvis, patentibus, corolla pluries brevioribus. *Corolla* pollicaris, translucida, tubulosa, supra medium ampliata, limbo truncato obscure 5-lobo. *Ovarii* pars infera obscure 5-costata; pars superior paulo longior in stylum attenuata. *Stigma* late ovoideum; lobis extus dense pilosis. *Glandulæ* epigynæ lineares, carnosæ. *Pollen* globosum, muricatum. *Semina* nitida; *testa* crassiuscula, albumine copioso; *embryone* tereti, *cotyledonibus* parvis, *radicula* cylindracea.

Gen. V. Cyclocodon, *Griff.*

Calyx basi ovario adhærens v. omnino liber et pedicello positus, 5-partitus, foliolis subserratis. *Corolla* breviter campanulata, 4–5-loba. *Stamina* 4–5. *Stylus* erectus. *Stigma* clavatum, 4-5-lobum, lobis demum revolutis. *Ovarium* 4–5-loculare, loculis sepalis oppositis, ovulis plurimis, placentis crassis axillaribus multiseriatim affixis. *Fructus* baccatus, irregulariter ruptus; semina numerosa, subangulata, compressa; testa lævi coriacea; embryone late clavato, cotyledonibus radiculaque brevibus. Herbæ *tropicæ, glaberrimæ, annuæ, inodoræ, succo aqueo; caules cylindracei, di-trichotome ramosi*; ramis foliisque *oppositis*; floribus *in cymas trichotomas dispositis, parvis, albis; pedunculis curvis, cernuis.*

1. CYCLOCODON PARVIFLORUM (*Hf. & T.*). Erectum, dichotome ramosum, foliis ovato-lanceolatis longe acuminatis serratis breve petiolatis subtus glaucis, sepalis liberis, floribus tetrameris.—C. distans, *Griff. MSS. Notul.* iii. Codonopsis parviflora, *Wall. Cat.* 1300; *Alph. D.C. Mon. Camp.* 123; *A. D.C. Prodr.* vii. 423. Campanumœa celebica, *Blume, Bijdr.* 727; *Alph. D.C. Monog. et in D.C. Prodr. l. c.*

Hab. In Himalayâ orientali tropicâ alt. 3000–5000 ped. Sikkim! Assam! et Mont. Khasia, alt. 2000–4000 ped.! *Wallich, Griffith, & Hf. & T.* (fl. August. Sept.). (v. v.)—*Distr.* Ins. Celebes! Java!

Herba inodora, glaberrima, gracilis, glaucescens, 1–3-pedalis, e basi v. superne ramosa. *Caules* teretes ramique stricti. *Folia* patentia, 1½–4 poll. longa, anguste v. late ovato-lanceolata, grosse obtuse irregulariter serrata. *Pedicelli* simplices v. divisi, validi, apice curvi, nudi v. paucifoliati. *Flores* albi, ⅓ unc. longi, nutantes. *Calyx* nunc basi floris adnatus, sæpius a flore remotus involucriformis. *Sepala* linearia, lanceolata v. subulata, integerrima v. grosse multi- v. paucidentata, ⅓–½ poll. longa, alabastrum non cælantia. *Ovarium* pyriforme, stipitatum. *Corolla* late cylindraceo-campanulata, infra medium 4-fida, lobis latis acutis. *Filamenta* dilatata, antheris linearibus æquilonga. *Stylus* superne infundibuliformis, glaber, in ramos stigmatosos 4 patentes fissus. *Bacca* globosa, vix carnosa, ¼–½ poll. lata, basi calyce stipata, 4-locularis. *Semina* in placentis latis axillaribus multiseriata, parva, compressa, subangulata, testa lævi coriacea; *albumen* carnoso-granulatum; embryo parvus, late clavatus, utrinque obtusus, cotyledonibus radiculaque brevibus.

2. CYCLOCODON TRUNCATUM (*Hf. & T.*). Erectum, dichotome ramosum, foliis ovato-lanceolatis acutis grosse obtuse serratis, floribus 5-meris, sepalis medio ovarii adnatis.—Codonopsis truncata, *Wall. Cat.* 130; *Alph. D.C. Monog.* 122.

Hab. Pegu ad ripas Irawaddi, *Wallich*! Mergui! *Griffith.*

C. parvifloro simillima sed major, robustior, floribus pentameris et calyce ovario adhærente, a pedunculo remoto.

Gen. VI. CYANANTHUS, *Wall.*

Calyx basi ovarii adhærens, 5-fidus, persistens, lobis valvatis. *Corolla* cylindracea, membranacea, marcescens, infundibuliformis v. subcampanulata, tubo calyce longiore, lobis 5 valvatis. *Stamina* 5, una cum corolla basi ovarii adhærentia, filamentis gracilibus, antheris oblongis liberis ?. *Ovarium* imo basi calycis adhærens, ceterum liberum, conicum, tubo calycis æquilongum, in stylum corollæ tubo breviorem attenuatum. *Stigma* obconicum v. clavatum, extus pubescens, 3–5-lobum, lobis brevibus erectis demum recurvis. *Ovarium* 3–5-loculare, loculis basi placentiferis; ovulis plurimis placentis axillaribus adnatis. *Capsula* conica, coriacea, calyce emarcido interdum inflato tecta, apice 3–5 valvis. *Semina* plurima, parva, oblonga; testa fusca v. brunnea.

Herbæ Himalayanæ, *succo aqueo* (*in omnibus* ?), *annuæ v. rhizomate multicipiti brevi perenni, pubescentes v. glabratæ*; rhizomatis rami *apice squamosi, squamis imbricatis*; caulibus *e ramis rhizomatis plurimis, prostratis, simplicibus, rarius divisis, speciebus annuis ramosis;* foliis *parvis, alternis, brevi-petiolatis, simplicibus v. lobatis, integerrimis et crenatis serratisve, subtus pallidis glaucisve, summis sæpissime florem involucrantibus ; floribus plerisque speciosis, cæruleis, terminalibus, solitariis, sessilibus v. breve pedunculatis.*

§ I. *Radix* perennis, caulibus simplicibus. *Corolla* ampla, limbo patente.

1. CYANATHUS INTEGER (*Wall. Cat.* 1472). Caule simpliciusculo elongato glabro, foliis elliptico- v. obovato-lanceolatis acutis supra medium serratis utrinque appresse pilosis, floribus terminalibus breve pedunculatis, calyce cylindraceo atro-villoso corollæ tubo ½ breviore. —*Benth. in Royle, Ill. Pl. Him.* 309; *Walp. Rep.* vi. 388. C. barbatus, *Edgw. in Linn. Trans.* xx. 82.

Hab. In Himalayæ regione temperatâ et subalpinâ, alt. 10,000–12,000 ped. Kumaon! *Blinkworth, Strachey & Winterbottom.* (fl. Jul.)

Caules spithamæi ad pedales, graciles, prostrati apicibus ascendentibus, apicem versus puberuli, cæterum glaberrimi nitidi. *Folia* brevissime petiolata, ½–⅔ unc. longa, subtus glauca, membranacea. *Flores* speciosi, erecti. *Calyx* ½ unc. longus, basi rotundatus, lobis ovato-lanceolatis acutis tubo æquilongis. *Corolla* pallide cærulea, anguste campanulata, glaberrima, lobis brevibus late ovatis vix acutis, glabris. *Stamina* tubo corollæ ½ breviore, filamentis gracillimis; antheris oblongis. *Ovarii* pars superior elongato-conica, staminibus æquilongis, in stylum brevem angustata; stigmate capitato 5-lobo.

2. CYANANTHUS LOBATUS (*Wall. Cat.* 1473). Caule simpliciusculo elongato, foliis cuneatis spathutalisve profunde inciso-lobatis crenatisve trilobisve segmentis obtusis cuneatis, subtus parce pilosis, floribus terminalibus breve pedunculatis, calyce cylindraceo atro-villoso corollæ late infundibuliformis tubo dimidio breviore, corollæ lobis late obovatis patentibus apice barbatis v. glaberrimis.—*Benth. in Royle, Ill.* 309; *Walp. Rep.* vi. 388.

Hab. In Himalayæ regione alpinâ, alt. 11,000–13,000 ped. Nepal!

Wallich. Kumaon! *Blinkworth, Edgeworth, Strachey & Winterbottom, Madden.* Sikkim! *J. D. H.* (fl. Aug.) (v. v.)

Caules subrobusti, spithamæi et ultra, plerumque plus minusve patentim pilosi, prostrati apicibus ascendentibus. *Folia* sparsa, ¾–1 unc. longa, latitudine varia, basi cuneata in petiolum latum angustata, 3-multiloba, subtus glauca, marginibus sæpius sicco recurva, subtus sæpissime pilosa, rarius utrinque pilosa v. utrinque glabra. *Flores* inclinati, speciosi, eos *C. integri* æquantes, sed limbo longiore latiore et magis expanso. *Pedunculus* atro-villosus. *Calyx* longitudine varius, nunc paulo longior nunc bis longior quam latus, lobis acutis ⅓ longitudine tubi. *Corollæ* limbus explanatus, laciniis apice glabris pilisve raris barbatis; tubus glaberrimus. *Stamina* et *ovarium* ut in *C. integro*; stigmate subclavato 4-lobo. *Capsula* calycis tubo æquilonga, apice breviter 4-5-valvis. *Semina* lineari-oblonga, testa fusca.

3. CYANANTHUS LINIFOLIUS (*Wall.*). Caulibus e rhizomate crasso plurimis ascendentibus foliisque pubescenti-pilosis glabratisve, foliis brevibus lineari-oblongis subacutis obscure crenato-serratis marginibus recurvis, floribus terminalibus breve v. longe pedunculatis, calyce cylindraceo atro-villoso corollæ tubo ½–⅔ breviore lobis lanceolatis acutis, corolla infundibuliformi-campanulata fauce villosa lobis apice acutis pilosulis rarius glaberrimis.—C. microphyllus! *Edgw. in Linn. Trans.* xx. 81.

Hab. In Himalayæ regione alpinâ, alt. 10,000–16,000 ped.! *Wall.*; Kumaon! *Edgeworth, Strachey & Winterbottom*; Sikkim! *J. D. H.* (fl. Aug. Sept.) (v. v.)

Rhizoma breve, crassum, multiceps, perenne. *Caules* perplurimi, graciles, prostrati demum ascendentes, 4 unc. ad spithamæum, basi squamis brevibus ovato-lanceolatis nitidis ¼ unc. longis imbricatis circumdati. *Folia* ¼–⅔ unc. longa, subtus glauca, plerumque utrinque pubescentia, rarius glabra. *Flores* speciosi, *C. integro* similes sed calyce plerumque breviore lobisque corollæ paulo longioribus. *Calycis* lobi ovato-lanceolati. *Corolla* pollicaris, fauce tuboque dense v. laxe villoso v. glaberrimo, lobis apice laxe ciliatis nudisve. *Ovaria* et stamina exacte cum *C. integro* quadrant; *stigmate* subclavato 4-5-lobo, lobis recurvis. *Capsula* calyce æquilonga, 4–5-valvis. *Semina* parva, oblonga, brunnea.

4. CYANANTHUS INCANUS (*Hf. & T.*). Caulibus e rhizomate crasso plurimis brevibus ascendentibus foliisque utrinque dense incano tomentosis, foliis brevibus ovatis ellipticis lanceolatisve marginibus obscure sinuato-crenatis recurvis, floribus terminalibus, calyce breviter cylindraceo incano v. fusco-tomentoso lobis brevibus, corolla calyce triplo longiore lobis oblongis fauce dense villosa.

Hab. In Himalayæ orientalis regione alpinâ, Sikkim, alt. 12,000–16,000 ped.! *J. D. H.* (fl. July, Aug.) (v. v.)

C. linifolio affinis sed minor, caulibus interdum ramosis foliisque dense tomentosis. *Rhizoma* crassum, multiceps. *Caules* basi squamis cincti, pilis patulis. *Folia* forma varia, subconferta, $\frac{1}{4}$ unc. longa. *Flores* sessiles v. pedunculati, suberecti, vix pollicares. *Calyx* breviusculus, pallidus, pilis subappressis, fructiferus paulo inflatus. *Ovarium* calyci æquilongum; stylo longiore quam in præcedentibus; stigmate *C. linifolii*. *Capsula* conica, calyci basi turgido æquilonga. *Semina* minima, oblonga, fusca.

§ II. *Annuæ*, caulibus ramosis. *Corolla* cylindracea, limbo non patente.

5. CYANANTHUS INFLATUS (*Hf. & T.*). Annuus, caulibus prostratis filiformibus ramosis patentim pilosis, foliis sparsis petiolatis rotundatis sinuato-dentatis crenatisve supremis subinvolucrantibus, calyce obovato breviter 5-dentato patentim fusco-villoso, corolla cylindracea brevissime 5-loba, capsulæ valvis ultra calycem inflatum globosum porrectis.

Hab. In Himalayæ orientalis regione alpinâ, alt. 11,000–16,000 ped. Bhotan! *Griffith* (1771); Sikkim! et Nepaliâ! orientalis, *J. D. H.* (fl. August.) (v. v.)

Herba statura variabilis, 2 unc. ad bipedalem! *Caules* prostrati, divaricatim ramosi, flexuosi, rigidi, ramosi, parce foliati. *Folia* sparsa, parva, $\frac{1}{4}$ unc. longa, 2 summa flori approximata. *Flores* suberecti, $\frac{1}{3}$–$\frac{1}{2}$ unc. longi, cærulei, sessiles v. pedunculati. *Calyx* basi turgidus, corollæ dimidio brevior; fructifer $\frac{1}{4}$–$\frac{2}{3}$ unc. diametro. *Corollæ* lobi brevissimi, erecti. *Ovarium* calyce longius; stylo brevi; stigmate obconico 5-lobo. *Capsula* late conica, valvis 5 exsertis recurvis acuminatis. *Semina* minima, oblonga, fusca.

6. CYANANTHUS (*sp. nov.* sed exemplaria manca). Annua, *Cerastoidea*, caulibus rigidius ramosis multifloris 2–4-pollicaribus, foliis parvis petiolatis ovatis, calycibus fructiferis parvis oblongis longe laxe villosis breviter 5-dentatis, capsulæ valvis 3–5 erectis subexsertis.

Hab. In Himalayæ regione alpinâ Nepaliæ orientalis, alt. 13,000 ped.! *J. D. H.* (v. fr. v.)

Gen. VII. WAHLENBERGIA.

1. WAHLENBERGIA AGRESTIS, *A. D.C.* (*Wight, Icon.* t. 1175). W. dehiscens, *A. D.C.* W. Indica, *A. D.C.* (*Wight, Icon.* t. 1176). Confer quoque W. gracilis, *A. D.C.*, ex Australia; W. quadrifida, *A. D.C.*, ex Australia; W. multicaulis, *A. D.C.*, ex Australia; W. Sieberi, *A. D.C.*, ex Australia; W. marginata, *A. D.C.*, ex Japan; W. lavandulæfolia, *A. D.C.*, ex Java; W. silenoides, *Hochst.*, ex Abyssinia. Species pleræque variabiles, valde affines, et si vere distinctæ vix characteribus propositis certe distinguendæ.

Hab. Per totam Indiam orientalem tropicam et subtropicam, arvis, locis sterilibus pinguibusque vulgatissima, a Ceyloniâ! ad Garwhal! (fl. per totum annum) (v. v.).—*Distr.* Chinâ, Africâ orientali? et australi?, et in Australiâ?

2. *Wahlenbergia peduncularis*, A. D.C. (sub *Campanula peduncularis*, Wall. in Prodr. viii. 483).

Hab. In Himalayæ orientalis provincia Kumaon! alt. 6000–7000 ped. *Blinkworth, Strachey & Winterbottom*, &c. (fl. temp. calid.).

Vera *Wahlenbergia* est ut rite conjicitur cl. A. DeCandolle. *Corolla* fere ad basin 5-loba; lobis vix æqualibus. *Capsulæ* pars superior conica, 3-valvis. *Stigmata* 3, revoluta. *Stamina* libera. *Anthera* lineari-oblonga, filamento infra medium dilatato ciliato ½ brevior.

Gen. VIII. Campanula, *L.*

1. Campanula (§ Medium) Griffithii *(Hf. & T.)*. Hispido-pilosa, caulibus e radice crassa plurimis suberectis dichotomis subramosis rigidis pallidis nitidis, foliis (⅓ pollicaribus) subsessilibus oblongo-lanceolatis dentatis utrinque hispido-pilosis, floribus subpaniculatis breve pedunculatis, calycis strigoso-hispidi tubo brevi lobis oblongo-ovatis sinubus breviter deflexis, corolla late campanulata pilosa, stylo elongato exserto, stigmatibus 2–3, capsula fere supera.

Hab. Affghanistan! *Griffith*, 695; Beloochistan! fissuris rupium frequens, *Stocks*, 954.

Radix lignosus. *Caules* perplurimi, 6 unc. ad spitham., suberecti, tereti-usculi, pilis reflexis sparse hispidi, uti tota planta pallidi, fragiles. *Folia* grisea, argute dentata v. subintegerrima, ciliata, superne strigosa. *Flores* nutantes sub ½ unc. longi. *Calycis* appendices longitudine variæ lobis corollæ ½ breviores, ciliatæ. *Corolla* basi inflata, lobis ovato-lanceolatis. *Stylus* corolla duplo longior. *Capsulæ* pars infra limbum calycis hispida, brevis, late turbinata; pars superior corolla persistente tecta, subhemisphærica. *Semina* minima, lineari-oblonga, pallide brunnea.

2. *Campanula latifolia*, L.

Hab. In Himalayâ centrali et occidentali temperatâ, alt. 7000–11,000 ped. Nepal! *Wallich*; Kumaon! *Blinkworth*, &c.; Simla, *Edgeworth*, &c.; Kashmir! (fl. Aug.) (v. v.)—*Distr.* Europa borealis et australis; in montibus Caucasi et Persiæ borealis.

3. *Campanula sylvatica*, Wall.

Hab. Regione temperatâ Himalayæ, alt. 5000–9000 ped. Bhotan! *Griffith*; Nepal! *Wallich*; Kumaon! *Strachey & Winterbottom*, &c. (fl. temp. calid.) (v. v.)

4. Campanula (Eucodon) cana, *Wall.* Tota dense cano-tomentosa, caulibus diffusis ramosis rarius teretibus subflexuosis, foliis (½–¾ poll.) subsessilibus ellipticis ovato-lanceolatisve subacutis utrinque albidis subtus obscure venosis crenatis integerrimisve, floribus (magnis) ad apices ramulorum paucis nutantibus, calycis cani tubo brevissimo lobis triangulari-ovatis integerrimis acuminatis corolla ter brevioribus, corollæ campanulatæ pubescentis lobis brevibus, stylo gracili, stigmatibus 3 brevibus inclusis.

Var. *α.* Caule ramisque villosis pilis sericeis subpatulis, foliis crenatis.

Var. *β.* Caule ramisque tomentosis robustis, foliis crenatis.

Hab. Montibus temperatis Himalayæ: var. *α.* Nepal! *Wallich*; Kumaon! *Strachey & Winterbottom*; Garwhal, 6000 ped.! *Edgeworth*; Simla, alt. 7000–8000 ped.! *T. Thomson.* (fl. Aug.) (v. v.)

Var. *β.* Bhotan! *Griff.* 2208. (fl. Sept. Oct.) (v. v.)

Species pulcherrima, *C. coloratæ*, var. *γ*, affinis, ubique pube nivea plus minusve tomentosa v. villosa vestita, floribusque magnis cæruleis conspicua. *Caules* 4–6 unc. longi, parce divaricatim ramosi, teretes, sicco subfragiles. *Folia* sparsa, rarius conferta, patula, plana v. rarius marginibus recurvis, $\frac{1}{3}$–$\frac{2}{3}$ unc. longa, obtusa, venis subtus crassis prominentibus. *Flores* breve pedicellati, pedicellis curvis. *Corolla* exemplaribus Kashmiricis fere pollicaris, pubescenti-pilosa. *Filamenta* basi latissima fimbriata, superne filiformia. *Ovarium* fere superum; pars superior late hemisphærica in styli basin abrupte attenuata, glaberrima. *Capsula* breviter obconica, valvis basilaribus.

5. *Campanula canescens*, Wall.

Hab. Affghanistan, *Griffith.* Planitie Panjab! Bengaliæ superioris! et orientalis! necnon convallibus tropicis Khasiæ! et Himalayæ! ad 6000 ped. ascendens, arvis et ruderatis vulgaris. (fl. per totum annum.) (v. v.)

Flores dimorphi, alii normales, alii minimi corolla et staminibus destituti.

6. *Campanula colorata*, Wall. — cf. *C. pallida*, Wall.; sequentes varietates habendas nobis videtur.

β. *Moorcroftiana*, calycis lobis angustis.

γ. *ramulosa*, calycis lobis subdentatis. *C. ramulosa*, Wall., Wight, Icon. 1178. *C. nervosa*, Royle! Ill. 253, sine descr.

δ. *Tibetica*; minor, collo multicipiti, ramis scaberulo-pubescentibus diffusis 3–6-pollicaribus, foliis elliptico-ovatis subdentatis, lobis calycinis late triangularibus; floribus sæpius dimorphis.

ε. *anomula*; calycis lobis sinubus subreflexis, cæterum *δ. Tibeticæ.*

Hab. In Himalayâ temperatâ, alt. 5000–6000 ped. (fl. æstate.)

var. *α.* Nepal! *Wallich*; Kumaon! *Strachey & Winterbottom*, &c.; Simla! *Edgeworth*, &c.; Kashmir! (v. v.)

var. *β.* Kumaon! Simla! Kunawur! Kashmir! Tibetiâ occidentali! et Affghanistan! *Griffith.* (v. v.)

var. *γ.* Montibus Khasia 5000–6000 ped.!, *Lobb*, &c.; Nilghiri! *Wight*, &c.; Sikkim, alt. 6000–10,000 ped.! Nepal, *Wallich*; Kumaon! *Strachey & Winterbottom.* (v. v.)

var. *δ.* In Tibetiâ occidentali Zanskar!, Kashmir!, &c., alt. 8000–12,000 ped. (v. v.)

var. *ε.* In Tibetiæ occidentalis regione temperatâ; Nubra, alt. 12,000 ped.! *T. T.* (fl. Aug.) (v. v.)

7. *Campanula Alphonsii*, Wall. Wight, Spicil. ii. 22. t. 125. Icon. 1177. —an forma *C. canæ*, Wall.?

Hab. Montibus Nilghiri regione temperatâ, alt. 7000–8000 ped.! *Wight*, &c. (fl. æstate.)

8. *Campanula Kashmiriana*, Royle.

var. β. *evolvulacea* (Royle), minor, caulibus laxioribus tenuioribus diffusis, floribus minoribus.

Hab. In Himalayæ et Tibetiæ occidentalis regione temperatâ, alt. 6000–13,000 ped.; Garwhal! *Strachey & Winterbottom*, &c.; Kunawur! Kishtwar! Kashmir! &c. (fl. æstate.) (v. v.)

Planta polymorpha, floribus dimorphis, aliis speciosis iis *C. coloratæ* subsimilibus (iconi Roylei congruentibus), aliis axillaribus longe gracile pedunculatis minimis, corolla et staminibus orbatis. *Flores* erecti v. nutantes. *Calycis* laciniæ interdum sinubus basi subreflexis ut in § *Medium*.

9. Campanula alsinoides (*Hf. & T.*). An forma apetala *C. coloratæ* var. *Tibeticæ*? patentim pubescenti-pilosa, ramis gracillimis prostratis filiformibus ramosis, foliis membranaceis oblongo-ovatis in petiolum angustatis subacutis obscure dentatis, pedicellis terminalibus axillaribusque elongatis filiformibus, calycis tubo globoso laciniis lanceolatis irregularibus integerrimis dentatisve.

Hab. In Himalayæ occidentalis provinciis Kunawur superiore!; Kishtwar! et in Tibetiâ occidentali! alt. 7000–10,000 ped. (fl. æstate.) (v. v.)

Radix perennis, lignosa. Rami v. caules perplurimi, uti tota planta pilis brevibus patentibus hispiduli, 4–8 unc. longi, flexuosi. *Folia* ⅓–1 unc. longa, læte viridia. *Pedunculi* ½–1 unc. longi. *Flores* nutantes. *Corolla* et stamina non visa. *Capsula* globosa, 1½ lin. diametro, membranacea, pubescens, basi poris dehiscens. *Semina* minima, lenticularia, pallida, nitida.—A forma apetala *C. Kashmirianæ* differt pilis elongatis patulis, foliis non canis, et calycis laciniis majoribus herbaceis.

10. *Campanula argyrotricha*, Wall. (Flores dimorphi.)

Hab. In Himalayâ occidentali temperatâ, alt. 8000–12,000 ped. Kumaon! *Blinkworth*, &c.; Garwhal! *Strachey & Winterbottom*; Simla! (fl. æstate.) (v. v.)

11. *Campanula fulgens*, Wall.; Wight, Icon. t. 1179; Illustr. t. 136.

Hab. In montibus subtropicis, alt. 4000–6000 ped., Khasiæ! Himalayæ centralis! et orientalis! (Nepal et Sikkim); Peninsulæ mont. Nilghiri! et Canaræ!, necnon in insulâ Ceylon! (fl. æstate.) (v. v.)

12. *Campanula aristata*, Wall.

Hab. In regione alpinâ Himalayæ. Sikkim! alt. 12,000–16,000 ped.; Nepal! *Wallich*; Zanskar et Tibetiâ occidentali, alt. 13,000–14,000 ped.! *Strachey & Winterbottom*, &c. (fl. August.) (v. v.)

13. Campanula (Eucodon) modesta (*Hf. & T.*). Pumila, glaberrima, uniflora, caule flexuoso simplici, foliis radicalibus petiolatis obovato-

oblongis rotundatisve, caulinis lineari-lanceolatis, flore nutante, calycis tubo lineari-clavato glaberrimo laciniis subulatis corolla campanulata breviter 5-loba $\frac{1}{2}$ breviore, stigmatibus 3 revolutis, capsula erecta obconica prismatica apice contracta, pedunculo apice incrassato alato torto.

Hab. In regione alpinâ Himalayæ orientalis, prov. Sikkim, alt. 11,000–14,000 ped. ! (fl. Aug.) (v. v.)

C. aristatæ Wall. affinis, differt statura humiliore, robustiore, calycis laciniis multoties brevioribus, et præcipue forma capsulæ. Herba 3–4-pollicaris, caule tereti striato, foliis radicalibus $\frac{1}{4}$ unc. latis, caulinis $\frac{1}{2}$ unc. longis. *Flores* parvi. *Calycis* tubus 2 lin. longus. *Corolla* cærulea, 2–4 lin. longa. *Anthera* linearis apiculata, filamento lineari glaberrimo paulo longior et latior. *Stigmata* 3 revoluta. *Capsula* coriacea, pyriformis, profunde sulcata, lateraliter dehiscens, nitida, sæpe atra, $\frac{1}{2}$ unc. longa. *Semina* minima, lenticularia, nitida.

14. Campanula (Eucodon) Khasiana (*Hf. & T.*). Hispidulo-pubescens, caule simplici erecto stricto subrobusto sulcato, foliis suberectis sessilibus obovato-oblongis acuminatis serratis utrinque hispidulo-pubescentibus subtus reticulatim venosis, racemo elongato terminali simplici v. paniculatim ramoso, floribus mediocribus nutantibus breve pedicellatis pedicellis bracteatis, calycis tubo subgloboso lobis setaceo-lanceolatis serratis corolla glabra ampla campanulata breviter 5-loba $\frac{1}{2}$ brevioribus, stylo gracili subexserto, stigmatibus 2 brevibus.

Hab. Montibus Khasia graminosis regionis temperatæ, alt. 5000–6000 ped. ! *Griffith, Lobb,* &c. (fl. July.) (v. v.)

Species pallidior, 1–3 pedalis. *Caulis* basi crass. pennæ anserinæ. *Folia* $1\frac{1}{2}$–3 unc. longa. *Flores* numerosi, remoti. *Calyx* glaber. *Bracteæ* anguste lanceolatæ, serratæ. *Corolla* $\frac{3}{4}$ unc. longa, e basi ad faucem sensim ampliata hinc subinfundibuliformi-campanulata, interdum 6–8-loba. *Filamenta* basi dilatata pilis copiosis ciliata, superne filiformia. *C. rapunculoidi* habitu et staturâ similis.

15. Campanula (Eucodon) Thomsonii (*Hf.*). Glaberrima v. inferne puberula, caule erecto subramoso gracili ramisque subangulatis, foliis (radicalibus subnullis) gracili-petiolatis ovatis ovato-cordatisve acutis v. apice attenuatis subserratis tenuiter membranaceis, floribus (inter minoribus) ramulis elongatis gracilibus laxe paniculatis pedicellatis erectis, calycis tubo glaberrimo breviter turbinato segmentis bracteolisque ad basin pedicellorum setaceis, corolla late campanulata profunde 5-fida tubo segmentis calycis breviore segmentis elongatis patentibus lineari-oblongis, stylo crassiusculo longo clavato, stigmatibus 2 brevibus.

Hab. In Himalayæ occidentalis sylvis temperatis in prov. Jamu, alt. 6000–7000 ped. ! (fl. April.) (v. v.)

Radix lignosa, perennis. *Herba* gracilis, tenera, plerumque glaberrima, parce ramosa, spithamæa ad bipedalem. *Folia* infima interdum obovata, cætera omnia inter se conformia v. suprema angustiora, omnia 1–2 unc. longa in petiolum gracilem superne alatum abrupte angustata, sicco translucida, irregulariter serrata, basi sæpe inæquilateralia. *Panicula* simplex v. ramosa, 6-8-flora, rarius 20–40-flora. *Pedicelli* graciles. *Calycis* tubus 1–2 lin. longus, subglobosus, profunde sulcatus; segmentis 2–4 lin. longis. *Corolla* alba? sub ½ unc. lata. *Filamenta* brevia, basi dilatata, ciliata; *antheræ* lineari-elongatæ post anthesin tortæ. *Styli* pars pilosa elongata columnaris.

Campanula anagalloides, Royle (Ill. 254 sine descript.), est *Cephalostigma hirsutum*, Edgw.

Gen. IX. PERACARPA, *Hf. & T.*

Calycis tubus obconicus, limbi lobis triangularibus. *Corolla* campanulata, profunde 5-loba, lobis æqualibus linearibus acuminatis. *Stamina* epigyna, filamentis linearibus liberis; antheris linearibus. *Stylus* elongatus, stigmatibus 3 revolutis. *Ovarium* 3-loculare. *Capsula* oblonga, pendula, tenuiter membranacea, apice contracta, oligosperma, irregulariter rupta. *Semina* magna, oblonga, testa coriacea.—Herba *debilis, ramosa, tenella, carnosula, prostrata v. repens, glaberrima;* foliis *petiolatis, ovatis, subacutis, sinuato-dentatis, pollicaribus;* pedicellis *axillaribus, gracilibus, erectis;* floribus *parvis, albis;* capsula *pendula, torulosa* (nomen *e πήρα saccus* et *καρπός*).

1. *Peracarpa carnosa*, Hf. & T.—Campanula carnosa, *Wall. Cat.* 1282, *et in Roxb. Flor. Ind.* ii. 102; *A. D.C. Prod.* vii. 474.

Hab. In sylvis humidis regionis temperatæ Himalayæ centralis! et orientalis! alt. 6000–10,000 ped., Nepal! Kumaon! *Strachey & Winterbottom, Wallich*; Sikkim! necnon in Mont. Khasia, alt. 5000–6000 ped.! (fl. Jul.) (v. v.)

Gen. X. PENTAPHRAGMA, *Wall.*

1. *Pentaphragma begoniæfolium*, Wall.

Hab. In Peninsulâ Malayanâ, ad Penang! *Wallich*; Singapore! *Lobb* et Mergui! *Griffith.* (fl. ?)

Quid *Symphyandra stylosa*, Royle, e Himalaya occidentali!

Tribe II. LOBELIEÆ.

Gen. XI. PIDDINGTONIA, *D.C.*

1. *Piddingtonia nummularia*, Lamk.

Hab. In montibus subtropicis Khasiæ et Himalayæ orientalis et centralis; alt. 4000–7000 ped. frequens (fl. temp. pluv.) (v. v.).—*Distr.* Java! et China!

* ISOLOBUS.

* *Isolobus Roxburghianus*, D.C.; an Lobelia cæspitosa, *Blum.*?

Hab. In horto botanico Calcuttensi! versosimiliter e China introducta. In hortis Anglicis mont. Khasiæ, alt. 4000 ped.! (v. v.) (fl. August.) —*Dist.* Java! et China!

Gen. XII. SPEIREMA, *Hf. & T.*

Calycis tubus globosus, limbi lobis lineari-subulatis, patentibus revolutisve. *Corolla* dorso ad basin fissa, bilabiata, labio superiore inferiore longiore lobis 2 linearibus acuminatis, inferiore subspathulato trilobo lobis lanceolatis acuminato-caudatis. *Antheræ* marginibus pilosis, 2 inferiores apice penicillatæ. *Fructus* globosus, subcarnosus, irregulariter ruptus, 2-locularis. *Semina* numerosissima, testa lævi coriacea.—Herba *elata, glaberrima, divaricatim ramosa ; ramis pedalibus gracilibus prostratis ; foliis* 2-4-*pollicaribus subdistichis secundisve, petiolatis, ovato-lanceolatis, longe acuminatis, irregulariter subduplicato-serratis ;* pedunculis 1-2-*pollicaribus, solitariis, axillaribus,* 1-*floris, elongatis ;* floribus *suberectis, luride purpureis ;* corolla *sub* $\frac{2}{3}$ *unc. longa, intus parce pilosa, calycis lobis angustissimis longiore ;* bacca *globosa, membranacea v. subcarnosa.* (Nomen σπείρημα, *spira*, ad calycis lacinias apice revolutas refert.)

1. *Speirema montanum*, Hf. & T.—Lobelia montana, *Blume, Bijd.* 728; *A. D.C. Prodr.* vii. 387.

Hab. In Sylvis Himalayæ regionis temperatæ provinciæ Sikkim, alt. 5000–7000 ped.! (fl. temp. pluv.) (v. v.)—*Distr.* Montibus Javæ!

Stirps Javanica ab Himalaica nullo modo differt.

Gen. XIII. LOBELIA.

1. *Lobelia trigona*, Roxb. (Antheræ omnes apice penicillatæ), cf. *L. Zeylanica*, Linn.; *L. trialata*, Ham.; *L. micrantha*, Hook.; *L. Reinwardtiana*, D.C.? *L. subincisa*, Wall.

Variat insigniter staturâ, caule crassiusculo v. gracili, erecto ramoso v. prostrato, foliis subsessilibus v. petiolatis, oblongis ovatis cordato-ovatisve, floribus axillaribus v. in paniculas terminales dispositis, corolla læte cærulea v. purpurea interdum saturate azurea.—An species 2 hic confusæ diutius inquirendæ?

Hab. Per totam Indiam (præcipue oryzetis) vulgatissima, a Birma! et Peninsula Malayana! usque ad Simla! in montibus Himalayæ crescit ad 6000 ped.! (fl. per totum annum) (v. v.)—*Distr.* China! Java!

2. *Lobelia affinis*, Wall.; cf. *L. succulenta*, Blume.

Hab. In Ceyloniâ! *Walker, Gardner, Thwaites* (C. P. cum 1776 et 2981 mixta) et Peninsulâ Malayanâ ad Malacca! *Lobb*; in Bengaliâ orientali! et montibus subtropicis Himalayæ orientalis! (Sikkim!) et montibus Khasiæ ad ped. 7000 ascendens haud infrequens! (fl. temp. pluv.) (v. v.)—*Distr.* China! Java!

Herba variabilis, cum *L. trigonâ* et *Piddingtoniâ* sæpe confusa.

3. LOBELIA LOBBIANA (*Hf. & T.*). Caule decumbente v. prostrato ramoso glaberrimo debili, ramulis puberulis, foliis petiolatis ovatis acutis argute serrulatis glaberrimis v. petiolo et costa puberulis, floribus axillaribus solitariis longe pedicellatis, pedicellis gracilibus folio æquilongis, calycis tubo puberulo lobis lineari setaceis patulis v. recurvis, corollæ tubo duro ad basin fisso breviter bilabiato labio inferiore trifido lobis oblongo-lanceolatis lateralibus subsimilibus, antheris glabris 2 inferioribus apice penicellatis.

Hab. Mont. Khasiâ! *Lobb.*

Species habitu et foliis *L. affinis* sed major, foliis 1–2-pollicaribus membranaceis, pedicellis valde elongatis gracilibusque, floribus triplo majoribus et tubo corollæ triplo longiore. *Calycis* lobi $\frac{1}{3}$ unc. longi, iis *Speirematis montani* subsimiles. *Corolla* fere $\frac{1}{2}$ unc. longa, tubo labiis duplo longiore.

4. LOBELIA GRIFFITHII (*Hf. & T.*). Pusilla, subaphylla, erecta, glaberrima, caule tenui simplici v. diviso, foliis squamæformibus distantibus erectis lanceolatis acuminatis, floribus parvis erectis v. inclinatis gracile pedicellatis caulem ramosve terminantibus, calycis tubo ovoideo lobis lanceolatis æquilongo, corollæ glabræ labro superiore inferiore breviore lobis acuminatis inferiore late trifido lobis brevibus acuminatis, staminibus glaberrimis, antheris omnibus apice penicillatis.

Hab. Peninsulâ Malayanâ ad Mergui! *Griffith.*

Species singularis, *L. trigonæ* affinis, *L. exili*, Hochst. Abyssiniæ simillima. *Caulis* 2–9 uncialis, e basi ad apicem sensim attenuatus, subsucculentus? simplex v. si divisus ramis erectis. Folia 1–1$\frac{1}{2}$ lin. longa, alterna. *Flores* cærulei, 1 lin. longi. *Calycis* lobi tubo subæquilongi, corolla $\frac{1}{2}$ breviores.

5. *Lobelia colorata*, Wall.; Wight, Icon. 1179.

Hab. Collibus siccis montium Khasiæ, regione temperatâ, alt. 5000–6000 ped.! *De Silva*; *Lobb.* (fl. August.)

6. LOBELIA ERECTA (*Hf. & T.*). Puberula v. glabrata 2–6-pedalis, caule striato erecto virgato subsimplici tereti puberulo folioso, foliis ellipticis elliptico-lanceolatisve obtusis obscure sinuato-dentatis, racemis strictis elongatis simplicibus basi foliosis, floribus brevi-pedicellatis, calycis tubo pubescente globoso laciniis lanceolatis subdentatis tubo corollæ pubescente $\frac{1}{2}$ brevioribus, corollæ labii superioris laciniis linearibus inferioris trifidi laciniis ovatis acuminatis, antheris glabris 2 inferioribus apice penicillatis.

Hab. Himalayæ orientalis regione temperatâ, Sikkim, alt. 9000–13,000 ped.! (fl. August.) (v. v.)

Herba erecta, caule subrobusto. *Folia* 2–3 unc. longa, subsessilia v. in petiolum breviusculum augustata. *Flores* numerosi, bracteati; bracteæ inferiores foliaceæ, superiores calycem superantes. Pedicelli 2–3 lin. longi, fructiferi elongati. *Corolla* sub. ½ unc. longa, sordide cærulea, labio superiore longiore, tubo intus piloso. *Capsula* membranacea, globosa, fere ½ unc. diametro, apice 2 valvis. *Semina* numerosissima, lenticularia.

L. coloratæ etc. affinis, differt conspicue caule simplici et calycis lobis brevibus.

7. *Lobelia pyramidalis,* Wall. Cat. 1302. ex parte—(antheræ glabræ).

Hab. In regionibus temperatis montium Khasiæ! et Himalayæ centralis et orientalis, alt. 5000–9000 ped.! Sikkim! Nepal! Kumaon! et Garwhal! *Wallich,* &c. (fl. temp. pluv.) (v. v.)

8. *Lobelia Wallichiana,* Hf. & T. (antheræ pilosæ et ciliatæ). *Rapuntium Wallichianum,* Presl. *L. pyramidalis β,* D.C.

Hab. In regionibus subtropicis montium Khasiæ! et Himalayæ centralis et orientalis a Sikkim! ad Kumaon! alt. 4000–7000 ped.! *Wallich* &c. (fl. temp. pluv.) (v. v.)

9. *Lobelia excelsa,* Leschenault (Wight, Ic. t. 1173, 1174).

Hab. Montibus Ceyloniæ! et Nilghiri! frequens (fl. temp. pluv.).

10. *Lobelia nicotianæfolia,* Heyne (Wight, Ill. t. 135); an forma *L. excelsæ*?

Hab. Montibus Peninsulæ Nilghiri! et Canara! frequens montibus Ceyloniæ!

11. *Lobelia aromatica,* Moon; (Wight, Ic. 1172). "Media inter *L. nicotianæfoliam* et *L. excelsam,*" Wight, *l. c.*;—mera varietas *L. nicotianæfoliæ* nobis videtur.

Hab. Regione temperatâ insulæ Ceylon!

12. *Lobelia rosea,* Wall.—*L. trichandra,* Wight, Ic. 1171.—*L. pyramidalis*? Hohen. Plant. Nilgh. 1367.

Hab. In Himalayæ centralis et orientalis regione subtropicâ Nepal! *Wallich*; Sikkim, alt. 3500 ped.! *J. D. H.*; montibus Khasiâ! *Domina Mack*; montibus Nilghiri! *Wight,* &c. (fl. Jan. April.) (v. v.)

Inter *L. nicotianæfoliam* et *Wallichianam* media. Cl. Wight descripsit varietatem antheris glabris.

L. chenopodifolia et *L. incisa,* Wall. sunt *L. cliffortioides,* Linn.

Species nobis incognitæ:—

L. arenarioides, Wall.
L. Sebæ, D.C.
L.? pumila, Burm.

Memorandum on the Principles of Generic Nomenclature in Botany, as referred to in the preceding Paper. Drawn up by G. Bentham, Esq., F.L.S.

[Read March 3rd, 1857.]

Two of the chief objects of the systematist in botany are, first, to collect plants into natural groups of successively higher value and greater scope according to their mutual affinities; and, secondly, to fix upon certain stages of these successive groups to which names should be attached for the purpose of reference. It is to the latter of these objects that we would now chiefly direct our attention.

The grand object accomplished by Linnæus in his nomenclature was to create a language by which plants could be spoken of, and by means of which groups of species (called *genera*) could be referred to, classed and treated of as easily as the species themselves.

He accordingly, treating his genera as *entities* (to use a word of Jeremy Bentham's) as natural as species, distributed them for practical purposes into his well-known artificial Classes and Orders.

The evident facilities for scientific study afforded by this grouping of species into natural genera, prompted Jussieu to carry the principle much higher; and, whilst he retained Linnean genera as the basis of botanical language, he established, for the purposes of science, his *natural orders* or groups of genera, which are in fact nothing more than genera of a higher grade, and he distributed these orders or large genera into classes and subclasses.

This system of—

Species grouped into natural genera,
Genera grouped into natural orders, and
Orders arranged in classes more or less natural;

with a language of—

Substantive names for the genera,
Adjective adjuncts for the species, and
Substantively taken adjectives for the orders,

has been ever since universally followed in theory, but has been most inconveniently departed from in practice.

With the great increase in the number of species known, and the increased facilities for the study of affinities afforded by the

Linnean language and the Jussieuan principles, botanists became aware that the species of a genus and the genera of an order could be collected into intermediate groups as natural and as well defined as the genera and orders themselves, and that names were, for scientific purposes, as useful for these subordinate groups as for those genera or orders.

To carry this into practice two different courses have been adopted:—

1. To maintain the original genera and orders in their integrity (except where a mistaken view of their affinities required them to be remodelled), calling the lower groups formed for scientific purposes *subgenera*, *sections*, *subsections*, *divisions*, &c., or *suborders*, *tribes*, *subtribes*, *divisions*, &c., as the case may be;—to maintain the original names for the purposes of language;—and, for the purposes of science, to give to the subordinate groups substantive or substantively taken adjective names as the case may be, whenever these subordinate groups are so well defined or so natural, that, *but for the convenience of language*, they might have made good genera or orders;—and, when these subordinate groups are less defined or less natural, either to give them no names at all, distinguishing them by figures or signs such as *, **, &c., or §1, §2, &c., or to give them mere adjective names.

Or 2ndly. To consider even the lowest of these intermediate groups between species and original genera, or between genera and original orders, as so many independent genera or orders, with their corresponding substantive or substantively taken adjective names expected to be introduced into ordinary botanical language.

The first of these courses appears to be the only one which can save botanical nomenclature from replunging into the chaos in which Linnæus found it. It was strongly advocated by the elder De Candolle; although in the latter years of his life, seeing how general was the disposition to convert his subgenera and sections into genera, and his suborders and tribes into orders, he himself more or less gave in to the general practice. The same principle was adopted by Endlicher, but he again was disposed to go too far in giving substantive names to purely technical or ill-defined subsections of genera.

The second course is that which is now unfortunately but too general. Independently of a natural pride we all feel in establishing new genera or orders, it is felt how useful it is, in the study of affinities, to define correctly and give names to all natural groups of every grade, however numerous they may be, and how easy it is, in the immense variety of language, to coin these names indefinitely; but it is not perceived that in attempting to introduce them all into ordinary botanical language, the memory is taxed beyond the capabilities of any mind, and the original and legitimate object of the Linnean nomenclature is wholly lost sight of. In a purely scientific point of view it matters little if the orders are converted into classes or alliances, the genera into orders, and the sections and subsections into genera; their relative importance does not depend on the names given to them, but on their height in the scale of comprehensiveness; but, for language, the great implement, without which science cannot work, it is of the greatest importance that the groups which give their substantive names to every species they include should remain large. If, independently of the inevitable increase of genera by new discoveries, such old ones as *Ficus*, *Begonia*, *Arum*, *Erica*, &c. are divided* into 10, 20, 30 or 40 independent ones, with names and characters to be recollected before any one species can be spoken of, if genera are to be reckoned by tens of thousands instead of thousands, the range of any individual botanist will be limited to a small portion of the whole field of the science. So also, so long as the number of orders can be kept within, or not much beyond a couple of hundred, it may reasonably be expected that a botanist of ordinary capacity shall obtain a sufficient general idea of their nature and characters to call them at any time individually to his mind for the purpose of comparison; but double that number, and all is confusion.

This inevitable confusion and the necessity of maintaining in some way the larger groups have been perceived by those even who have gone the farthest in lowering the scale of orders and genera. As a remedy they propose to erect the old genera into independent orders, and the old orders into classes or alliances. This is but an incomplete resumption of the old principles without the advantages of the old nomenclature.

It must be recollected that, although we choose a well-defined and natural group as the one to which we give a generic name, yet this is no indication that that group is considered as the *best* defined and better defined than the group immediately above it; on the contrary it is frequently less so. It is by no means pretended that *Urostigma* or *Pharmacosyce* are better defined than the old genus *Ficus*, or that the new genera that have lately been cut out of the old genus *Begonia* form more natural groups than *Begonia* itself does; but the principle in these cases seems to be adopted, that the lowest definable group above a species is a genus. Go a step farther, and every species becomes a genus with a substantive name!

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* And it must be borne in mind, that if genera so eminently natural and universally recognized as these, are to be thus subdivided and renamed for ordinary botanical parlance, so must *Carex*, *Rubus*, *Salix*, and hundreds of other equally well-established genera be.

And let it not be forgotten, that although the analytical process carried to the uttermost is necessary for the purpose of ascertaining the facts upon which botanical science is based, it is a judicious synthesis alone which can enable the human mind to take anything like a comprehensive view of those facts, to deduce from them the principles of the science, or to communicate to others either facts or principles.

Synopsis of the genus *Clitoria*.

By GEORGE BENTHAM, Esq., F.L.S.

[Read March 3rd, 1857.]

IN working up the *Phaseoleæ* with a view to defining the limits of the Brasilian species for Von Martius's Flora, the genus *Clitoria* has appeared to me to present some points of interest, as well in regard to its geographical distribution, as to its systematic demarcation. I have therefore been induced to offer to the Linnean Society the following short synopsis, prefaced by a few general remarks on both these points.

Of the two principal types of the genus, the one, *Ternatea*, is African and Asiatic, but apparently confined in Africa to the eastern tropical coast and adjacent Mascarene Islands, and in Asia to the nearly adjoining western districts of East India. The other type, *Clitoria* proper, is American, widely distributed over South America, east of the Andes, stretching northward into the southern United States of North America, and westward to the Cordilleras, in Mexico and Central America; but, even there, scarcely crossing to the west coast. It is one of the northern species of this American type, ranging on that continent from New Jersey to Mexico and Oaxaca, that reappears in great profusion in a very limited district in the Khasiya mountains in East Bengal, as well as in Tavoy, where it is accompanied by another apparently distinct species, found also in Java, but of the same North American type.

This singular identity of species in these two districts so widely separated, has been noticed before, but only in one or two instances considered as quite exceptional. The case of the *Phryma leptostachya* has long been known, and is mentioned by Alph. De Candolle in his enumeration of what he terms *espèces disjointes*, which may be rendered by *discontinuous* or *dissevered* species. He also alludes to the *Saururus cernuus* as common to North America and China; the very remarkable circumstance of the rare *Tipularia* occurring at once in the eastern United States and in the Himalayas, was alluded to by Dr. Lindley, in a paper recently read to the Society; and we may now mention, as additional instances of perfect identity, the *Osmorhiza brevistylus* and *Monotropa uniflora*, common to these widely distant regions. My *Amphicarpæa Edgworthii*, from the Himalaya, is so closely allied to the common North American *A. monoica*, that the trifling differences observed in the few specimens examined would probably disappear in other specimens. And in such genera as *Schizanthus*, *Podophyllum*, *Thermopsis*, *Astilbe*, *Itea*, *Adenocaulon*, *Glossanthus*, *Turpinia*, *Streptopus*, *Trillium*, and many others—although the N. American or Mexican and Himalayan species may not be identical—yet their close affinity, in well-marked genera containing but very few species, has almost equal weight in regard to their geographical distribution.

The *Clitoria* which has been the occasion of these remarks is the *C. acuminata*, Wall., a common Khasiya plant, which proves to be identical with the original *C. Mariana*, Linn., from North America. When I gave a diagnosis of Wallich's plant in the 'Plantæ Junghuhnianæ,' this similarity did not strike me, owing to the greater luxuriance of the Indian specimens, their larger stipules, more pointed leaflets and calyx lobes, &c., frequent results of luxuriance in allied species; whilst the few American species I then possessed were all from the dry soils where they are said to grow in the United States. Having now, however, had before me a large number of specimens from a great variety of localities, I found, when I came to draw up comparative characters for the two supposed species, that several of the more luxuriant American ones from Texas and Mexico were, in the above-mentioned points also, identical with the East Indian plant.

The *C. macrophylla*, Wall., from Tavoy and Java, only known by a small number of specimens, still remains a detached East Asiatic representative of a considerable American type; a fact which calls to mind how frequently large American genera (such as *Eupatorium* *Aster*, *Solidago*, *Solanum*, &c.) are represented in Eastern Asia by a small number of species, which gradually diminish or disappear altogether as we proceed westward towards the Atlantic limits of Europe; whilst the types peculiar to the extreme west of Europe (excluding, of course, the Arctic flora) are wholly deficient in America. These are among the considerations which suggest an ancient continuity of territory between America and Asia under a latitude, or at any rate with a climate, more meridional than would be effected by a junction through the chains of the Aleutian and Kurile Islands.

In a systematic point of view I had formerly endeavoured to render *Clitoria* more natural, by the elimination of DeCandolle's section *Centrosema*; and I now find it necessary for the same purpose to unite with it the *Neurocarpum* of Desvaux, hitherto universally adopted by other botanists, myself included. This entails the giving up, as a generic character, one which, in *Leguminosæ*, is usually considered as absolute, the raised longitudinal nerve or wing along the centre of each valve of the pod. It is the same peculiarity which has induced the separation of *Tetragonolobus* from *Lotus* among European plants. But in the division of *Lotus*, as well as in that of *Clitoria*, this purely technical character is unaccompanied by any other differences, and I have now instances in *Clitoria* where it is inconstant in one and the same species, and even on the same specimen.

Before the introduction of Jussieu's natural system, carpological characters were comparatively little attended to; but from the time he first pointed out their great importance, the absolute necessity of taking them into consideration in all natural classifications, has been very properly insisted on by all the great botanists of modern days. There are instances, however, in which this principle may have been carried too far. The external forms acquired by fruits in their development from the ovary to maturity, and especially the foliaceous appendages they assume, are sometimes irrespective of their organic structure, and appear then of little more consequence than the foliaceous wings or appendages on the branches, inflorescences, or calyx tubes. So also the form of the membranous expansions of samaroid fruits, the consistence of pericarps, the number and arrangement on the calyx and other foliaceous appendages of the oleaginous deposits, called *transparent glands* in *Leguminosæ*, *Hypericineæ*, &c., or *vittæ* in *Umbelliferæ*, useful as they all may be in certain cases, as indicative of general organic differences, have yet *per se* but little absolute value in classification. This absolute reliance, in supposed conformity to general principles, upon such characters, even when unaccompanied by any other differences, is one of the sources whence botanical science is daily inundated by torrents of new genera, which threaten ere long completely to drown all system. Where the presence or absence of these appendages or glands, or any peculiarity in their arrangement, appears to be consequent upon a general difference in the plan of the fruit or in the habit of the plant, or is accompanied by corresponding characters in other organs, it should be carefully attended to. But where one or more species of a natural genus differ from the rest by some such external peculiarity in the development of the fruit alone, it seems against all principles laid down for a natural method, to take that peculiarity as a generic character, merely because it is a carpological one.

Neglecting, therefore, entirely the longitudinal wing of the pod (the development of lateral nerves in the carpellary leaf), we have a genus at once known by its calyx and corolla, and separable into two, or rather into three, types by habit and foliage, and probably also by the seed. So far as known, at least, the seeds of the sections *Ternatea* and *Neurocarpum* or *Clitoria* proper, are very different. I have collected the shrubby or lignescent American species into a third section, characterized by their habit only; for although in some species I have seen pods apparently full grown, yet the seeds are not far enough advanced to say whether they are compressed and smooth, as in *Ternatea*, or endued with the peculiar viscid exudation of *Neurocarpum*.

In nearly all the *Clitorias*, whether with or without winged pods, the lower flowers are often apetalous, almost without stamens, and with smaller calyxes, but producing perfect fruits. This circumstance, long since known in the allied genus *Amphicarpæa*, and more recently observed in *Clitoria glycinoides*, led, when first discovered, to the establishment of Leandro de Sacramento's genus *Martia*, in which Zuccarini included a similarly circumstanced species of *Galactia*.

CLITORIA.

Clitoriæ sp. Linn.—*Ternatea* et *Neurocarpum*, Desv.—H. B. et K. Nov. Gen. et Sp. Amer.—*Clitoria*, Sect. 1 et 2, et *Neurocarpum*, D.C. Prod. vol. ii.—*Clitoria* et *Neurocarpum*, Benth. in Ann. Mus. Vind. vol. ii.

Calyx tubulosus, apice 5-fidus, laciniis superioribus latioribus, summis sæpe altius connatis, infima angustiore. Vexillum amplum, emarginatum v. bifidum, basi in unguem latum angustatum, exappendiculatum. Alæ falcato-oblongæ, vexillo breviores, longe unguiculatæ, patentes, carinæ breviori falcatæ acutæ cohærentes. Stamina mona-

delpha v. filamento vexillari demum soluto diadelpha. Ovarium stipitatum, basi disco brevi cupulato circumdatum, pluriovulatum. Stylus incurvus, apice plus minus dilatatus, facie interiore longitudinaliter barbatus. Legumen stipitatum, lineare, valvulis planis v. convexis, nudis v. medio costa longitudinali percursis. Semina compressa v. subglobosa, estrophiolata.

Herbæ fruticesve, nunc volubiles v. alte scandentes, nunc humiles suberecti v. prostrati, Americani, Asiatici v. Orientali-Africani. Stipulæ persistentes, sæpe lineatæ. Folia pinnatim tri-pluri-foliolata, foliolis oppositis cum impari distante, stipellis setaceis, rarius subnullis. Pedunculi axillares, 1–2-flori v. racemiferi, floribus secus rachin solitariis v. sæpius geminis. Bracteæ persistentes, stipulis similes v. sæpius majores, inferiores binæ oppositæ distinctæ, superiores solitariæ (duæ in unam coalitæ). Bracteolæ sub calyce geminæ, vulgo bracteis majores. Flores speciosi (sæpe 2–3-pollicares) purpurascentes, cærulei, albi v. rubri.

Sect. I. TERNATEA.

Caulis herbaceus v. rarius fruticosus, prostratus, volubilis v. scandens. Folia 5–9-foliolata rarius subtrifoliolata. Leguminis valvulæ planæ v. leviter convexæ, non costatæ. Semina subreniformia, compressa, lævia.

1. C. LASCIVA, *Boj.* (Benth. in Ann. Mus. Vind. vol. ii. p. 114), caule fruticoso volubili foliisque subtus tomentoso-pubescentibus, foliolis 7–11 ovatis v. ovato-lanceolatis, stipellis setaceis, pedunculis elongatis bi-pluri-floris, bracteolis late ovatis acutis calycis dimidio brevioribus, legumine pubescente.

Hab. In ins. Madagascaria, ubi scandet in arbores et frutices, ad margines fluviorum provinciæ Betanimena oræ orientalis (*Bojer*).

2. C. TERNATEA (Linn. Spec. Pl. p. 1086), herbacea volubilis puberula, foliolis 5–7 rarius 9–11 ovatis oblongisve, pedunculis brevibus unifloris, bracteolis late ovatis orbiculatisve calycis dimidium subæquantibus, legumine acuminato pubescente.

C. ternatea, Bot. Mag. t. 1542.—*Ternatea vulgaris,* H. B. et K. Nov. Gen. et Sp. Amer. vol. vi. p. 415.

Hab. In Asiæ, Africæ, et Americæ regionibus calidióribus frequentissime culta et hinc inde quasi spontanea, verosimiliter in Africa orientali tropica indigena.

Foliola vulgo pollicaria v. majora. Flores azurei, fere bipollicares.

3. C. PILOSULA (Wall. Cat. Herb. Ind. n. 5347), herbacea volubilis pilosula, foliolis 5–7 parvis ovatis oblongisve, pedunculis brevibus unifloris, bracteis late ovatis orbiculatisve calycis dimidio brevioribus, legumine pubescente mutico.

Hab. In Indiæ Orientalis Peninsulæ provincia Concan (*Stocks*).

An *C. ternateæ* var. ? Specimina pauca quæ vidi differre videntur foliolis floribusque multo minoribus, legumine rectiore, vix 1½ poll. longo, 2½-3 lin. lato.

4. C. HETEROPHYLLA (Lam. Dict. vol. ii. p. 51), glabra, caule tenui volubili, foliolis 5-7 parvis reticulatis foliorum inferiorum orbiculatis superiorum linearibus, stipellis minutis v. nullis, pedunculis brevibus unifloris, bracteolis ovatis acutis calyce pluries brevioribus, legumine plano glabro.

Hab. In ins. Mauritio (*Sieber*, n. 151, *Telfair*, *Gardner*, &c.).

5. C. BIFLORA (Dalz. in Hook. Kew Journ. Bot. vol. ii. p. 35), herbacea pilosula suberecta, foliolis 3–5 ellipticis lanceolatisve, stipellis setaceis, floribus geminis subsessilibus reflexis, egumine brevi falcato plano pubescente.

Hab. In India Orientali prope Bombay (*Dalzell*, *Law*, *Stocks*, &c.).

Species inflorescentia et legumine distinctissima. Flores pro genere parvi.

6? C. PEDUNCULATA (Boj. Benth. in Ann. Mus. Vind. vol. ii. p. 114), glabra, caule filiformi, foliolis 3 lanceolato-linearibus acutiusculis, stipellis subnullis, pedunculis filiformibus unifloris, bracteolis lineari-lanceolatis acutis calyce multo brevioribus.

Hab. In ins. Madagascaria inter frutices ad margines fluviorum (*Bojer*).

Specimina olim vidi in herbario Musæi Vindobonensis. Species mihi videbatur *C. heterophyllæ* valde affinis, sed diversa foliolis (an constanter) 3 nec pluribus duplo longioribus, et pedunculis longis tenuibus.

Sect. II. NEUROCARPUM.

Herbæ volubiles v. prostrati v. breviter erecti. Folia uni- vel trifoliata. Leguminis valvulæ convexæ, costa longitudinali medio percursæ v. rarius ecostatæ. Semina globosa, ovoidea v. crasse subreniformia, extus glanduloso-viscosa.

* *Caule herbaceo volubili.*

7. C. MACROPHYLLA (Wall. Cat. Herb. Ind. n. 5345), caule rigido subvolubili piloso v. glabrato, foliolis 3 ovalibus subcoriaceis supra glabris subtus appresse pilosis, racemis brevissimis confertis, bracteis oblongis calycis tubo brevioribus, vexillo villoso, legumine glabro ecostato.

C. javanica, Miq. Fl. Ned. Ind. vol. i. p. 226.

Hab. In India Orientali, in montibus Prome et Tavoy (*Wallich*). In Java (*Horsfield*).

Foliola 3–4-pollicaria, petiolo communi flores superante. Flores 1¾ poll. longi. Legumen bipollicare.

8. C. MARIANA (Linn. Spec. Pl. p. 1026), glabra v. vix pilosula, caule prostrato v. volubili, foliolis 3 ovato-oblongis v. lanceolatis membranaceis sæpius acutis, pedunculis 1–3-floris, bracteolis lanceolatis calyce multo brevioribus, vexillo glabro, legumine glabro ecostato.

C. Mexicana, Link. Enum. vol. ii. p. 235.—*C. acuminata*, Grah. in Wall. Cat. Herb. Ind. n. 5346.—*C. Grahami*, Steud. Nom. Bot. ed. 2; Benth. in Pl. Jungh. vol. ii. p. 30.

Hab. In America septentrionali, in solo sicco præsertim secus fluvia a New Jersey ad Floridam et Alabama (*Torrey, Gray,* &c.). In prov. Texas (*Drummond, Lindheimer,* &c.); in Mexico in dumetis prope Jalapam (*Schiede et Deppe, Linden,* n. 689), prope Talea (*Hartweg*), in præruptis prov. Oaxaca, altit. 3000–4000 ped. (*Galeotti,* n. 3146), et in India orientali in montibus Khasiya, altit. 5000–6000 ped. (*Hooker fil. et Thomson, Griffith,* n. 343, *Lobb*), in Tavoy (*Wallich*).

Variat in solo pinguiore et calidiore foliolis et præsertim stipulis majoribus, calycis laciniis longioribus angustioribusque, &c., sed specimina Asiatica nequaquam a Mexicanis differunt.

9. C. GLYCINOIDES (D.C. Prod. vol. ii. p. 234), herbacea volubilis pubescens v. villosa, foliolis 3 ovatis oblongisve subtus sericeo-pubescentibus villosisve, pedunculis 1–3-floris, bracteolis ovato-lanceolatis calyce multo brevioribus, legumine subfalcato valvulis medio costatis v. rarius subnudis.

C. falcata, Lam. Dict. vol. ii. p. 51 ex parte ?*.—*Neurocarpum falcatum,* DC. Prod. vol. ii. p. 236.—*Clitoria rubiginosa,* Pers. Syn. vol. ii. p. 303. —*Neurocarpum glycinoides, rubiginosum, ellipticum* et *villosum,* Desv. cfr. Ann. Sc. Nat. Par. ser. 1. vol. ix. p. 413. —*Martia physalodes,* Leandr. Sacr. Denkschr. Acad. Mun. vol. vii. p. 23. t. 12. —*Martia brasiliensis,* Zuccar.—*Neurocarpum argenteum,* Duchass. et Walp. in Flora, 1853, p. 228.

Hab. In America orientali tropica frequens; in tota Brasilia, in Peruvia orientali (cis-Andina), Guiana, insulis Indiæ occidentalis, et in Panama.

** *Caule prostrato flagellari.*

10. C. FLAGELLARIS, herbacea, rufo-pubescens, ramis prostrato-flagellatis, foliolis 3 oblongo-lanceolatis obtusis utrinque villosulis, pedunculis 1–3-floris, bracteolis lato-lanceolatis calyce multo brevioribus, legumine costato.

Neurocarpum flagellare, Benth. in Hook. Journ. Bot. vol. ii. p. 58.

Hab. Ad Rio Branco Brasiliæ borealis (*Schomburgk*).

Specimina perpauca vidi a *C. glycinoide* distincta imprimis ramis non volubilibus et foliolis angustis.

11. C. RUFESCENS, herbacea procumbens (v. subvolubilis?), foliolis 3 oblongo-ovatis ellipticisve mucronatis subtus ramis pedunculisque rufo-villosis, pedunculis 1–3-floris, bracteolis ovato-acutis calyce multo brevioribus.

Neurocarpum rufescens, Benth. in Ann. Mus. Vind. vol. ii. p. 116.

Hab. In Brasiliæ campis editis ad Tejuco et Villa do Principe prov. Minas Geraes (*Martius*).

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* Lamarck's description of the fruit does not agree with that of this species, but DeCandolle, who saw the original specimen in Jussieu's herbarium, had certainly this plant in view. If the identity is confirmed, Lamarck's specific name should be adopted. That of Persoon is applicable only to the more hairy varieties.

Species e specimine unico descripta intermedia videtur inter *C. glycinoiden* et sequentes. Flores fere *C. guianensis* sed calyx rufo-villosus et bracteolæ latiores.

*** *Caule e rhizomate lignoso herbaceo ascendente v. erecto vix ramoso.*

12. C. NANA, herbacea pilosula v. glabrata, caule abbreviato, foliolis 3 oblongis ellipticisve, pedunculis unifloris, bracteolis lineari-lanceolatis calyce multo brevioribus, leguminis valvulis nudis.

Hab. In Brasiliæ meridionalis prov. Rio Grande, in campis siccis prope Porto Alegre (*Tweedie*).

Caules e rhizomate lignoso 1–4-pollicares. Planta cæterum formis minimis *C. guianensis* similis, sed floris color diversus videtur et leguminis valvulæ (semper ?) ecostatæ.

13. C. SIMPLICIFOLIA, herbacea erecta subsimplex glabra, foliolo subsessili ovali obtuso basi rotundato, pedunculis bifloris racemosisve, bracteolis lanceolatis calyce multo brevioribus, leguminis valvulis costatis.

Neurocarpum simplicifolium, Kunth, Mimos. p. 213. t. 59.

Hab. In locis arenosis ad margines fluviorum, &c. ad flum. Orinoco (*Humboldt et Bonpland*), in Brasiliæ prov. Goyaz et Pernambuco (*Gardner*, n. 2822 et 3669).

Caules e rhizomate lignoso semipedales ad pedales. Foliola semper vidi solitaria subcoriacea. Flores *C. guianensis.*

14. C. GUIANENSIS, herbacea erecta v. adscendens glabra v. albopilosa, foliolis 3 longe oblongis linearibus v. imis solitariis, pedunculis 1–2-floris, bracteolis lanceolatis calyce multo brevioribus, leguminis valvulis costatis v. rarissime subnudis.

Crotalaria guianensis, Aubl. Pl. Gui. vol. ii. p. 761. t. 305 *.—*Crotalaria longifolia*, Lam. Dict. vol. ii. p. 201.—*Neurocarpum angustifolium*, Kunth, Mimos. p. 218. t. 60. — *N. guianense*, Desv. Journ. Bot. 1814, vol. i. p. 75. — *N. longifolium* et *N. frigidulum*, Mart., Benth. in Ann. Mus. Vind. vol. ii. p. 116.

Hab. ——?

Caules e rhizomate lignoso semipedales ad pedales. Foliola sæpe semipedalia. Calyx 12–15 lin., corolla 2 poll. longa. Species differt a *C. nana* statura et legumine, a *C. simplicifolia* foliolis ternis angustis, a *C. cajanæfolia* statura humiliori, foliolis longioribus subtus minus canescentibus.

15. C. CAJANÆFOLIA, herbacea erecta plus minus canescens, foliolis 3 oblongis v. imis solitariis, pedunculis 1–2-floris, bracteolis ovatis calyce multo brevioribus, leguminis valvulis costatis v. rarius nudis.

Neurocarpum cajanæfolium, Presl. Symb. Bot. p. 17. t. 9.—*N. retusum*, Hassk. Pl. Jav. rar. p. 376.—*Lotus fluminensis*, Vell. Fl. Flum. vol. vii.

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* Aublet's drawing and description agree in everything but the corolla, which he evidently only had in an imperfect shrivelled state.

t. 132.—*Clitoria laurifolia*, Poir. Dict. Suppl. vol. ii. p. 301.—*Neurocarpum laurifolium*, Desv. (forma glabrior legumine sæpius ecostato).

Hab. In Brasiliæ et Guianæ collibus imis arenosis frequens, etiam in ins. Trinitatis (*Sieber*, n. 187), Porto Rico et S. Domingo (*Poiteau* in Herb. Mus. Par.), et ex America allata in Java (*Zollinger*, n. 748, v. 784 in Herb. meo), Malacca (*Griffith*), et Singapore (*Herb. Hooker*).

A *C. guianensi* vix characteribus certis definienda etsi habitu facile recognoscenda. Caulis rigidior, elatior, vulgo 1–2-pedalis; foliola raro 3 pollices excedunt, vulgo obtusissima v. retusa, subtus canescentia v. sericeo-villosa. Flores paullo minores. Legumen variat costa longitudinali elevata v. tenui v. (in speciminibus a me olim in herbariis nonnullis sub nomine *C. glycinoides*, DC. in Herb. Mus. Par. distinctis) omnino nulla. Specimina nonnulla Gardneriana utrumque legumen ostendunt in eadem planta.

16. C. DENSIFLORA, herbacea erecta, caule ferrugineo-villosulo, foliolis 3 obovali-oblongis infra glabris subtus sericeo-villosis, pedunculis bifloris in axillis superioribus abbreviatis, bracteis lanceolatis calyce brevioribus, leguminis valvulis costatis.

Neurocarpum densiflorum, Benth. in Ann. Mus. Vind. vol. ii. p. 117.

Hab. In campis fruticetisque Brasiliæ provinciæ Minas Geraes (*Pohl, St. Hilaire, Weddell*).

Præcedenti affinis sed villosior, foliola magis coriacea latiora, stipulæ et bracteæ majores acuminatæ striatæ, inflorescentia densior.

17. C. STIPULARIS, herbacea erecta, caule piloso, foliolis 3 ovali-ellipticis subtus glaucis tenuiter puberulis, pedunculis plurifloris folio brevioribus, bracteolis lanceolatis membranaceis calyce paullo brevioribus, leguminis valvulis costatis.

Neurocarpum bracteatum, Mart., Benth. in Ann. Mus. Vind. vol. ii. p. 116.

Hab. In sylvis Catingas Brasiliæ provinciæ Bahia (*Martius*).

Caules basi duri, bipedales (v. altiores ?). Stipulæ, bracteæ et bracteolæ membranaceæ, majores quam in præcedentibus. Pedunculi elongati, vulgo 4–6-flori. Flores paulo minores videntur.

Sect. III. CLITORIANTHES.

Frutices erecti v. alte scandentes, ramulis tunc plus minus volubilibus. Folia trifoliolata. Leguminis valvulæ coriaceæ, planæ v. leviter convexæ. Semina matura ignota.

* *Bracteolis angustis v. calyce multo brevioribus.*

18. C. POLYSTACHYA (Benth. Pl. Hartw. p. 60), fruticosa erecta ramosa, foliolis oblongis sublanceolatisve superioribus acutis subtus ramulisque sericeo-pubescentibus, pedunculis multifloris, bracteolis parvis linearibus, leguminis valvulis turgidulis ecostatis.

Hab. In Mexico prope Talea (*Hartweg*), ad San Dionysio in ditione Oaxaca (*Andrieux*, n. 463).

Species quodammodo inter *Neurocarpa* et *Clitorianthes* ambigit, a prioribus caule fruticoso et inflorescentia differt, legumen tamen brevius valvulis convexioribus quam in *Clitorianthis* plerisque.

19. C. BRACHYSTEGIA (Benth. Bot. Sulph. p. 84), fruticosa elata subscandens, foliolis 3 ovatis supra glabris subtus tenuissime puberulis glabrisve, racemis multifloris, bracteolis minimis ovatis, calyce amplo brevi, vexillo pubescente.

Hab. In Peruvia prope Guayaquil (*Sinclair*).

Habitus et folia *C. arborescentis* sed glabrior, et calyx quam in omnibus *Clitoriis* proportione latior, dentibus brevibus late orbiculatibus obtusissimis v. vix aculeatis, infima angustiore triangulari. Corolla omnino *C. arborescentis*. Legumen non vidi.

20. C. ARBORESCENS (Ait. Hort. Kew. ed. 2. vol. iv. p. 302), fruticosa elata v. subscandens, foliolis 3 ovatis ellipticisve supra glabris subtus pallide v. rufo-pubescentibus v. sericeo-villosis, racemis multifloris, bracteolis acuminatis calyce multo brevioribus, vexillo pubescente, legumine elongato plano valvulis coriaceis ecostatis.

C. Poitei, DC. Prod. vol. ii. p. 234. *C.* [illegible], Miq. Stirp. Surin. p. 24.

Hab. In America tropica in Surinamo (*Hostmann*, n. 50 et 1007, *Kappler*, n. 1936), in Guiana gallica (*Perrottet*), et anglica (*Anderson*, *Parker*, *Rob. Schomburgk*, coll. ii. n. 843, *Rich. Schomburgk*, n. 1531), in ins. Trinitatis (*Lockhart*), St. Vincentii (*Guilding*), et in Panama (*Cuming*, n. 1142, *Sinclair*).

Frutex ab aliis collectoribus elegans dicitur fere arborescens ramis divaricatis diffusisve, ab aliis frutex scandens. Foliola subcoriacea, ampla, maxima usque ad 8 poll. longa, 4 poll. lata, ramealia dimidio minora. Pedunculi folio breviores, a basi pluri- v. multiflori. Flores breviter pedicellati. Bracteolæ vulgo 2–3 lin., interdum 6 lin. longæ, angustæ. Calyx pollicaris, dentibus acutis v. acuminatis. Vexillum bipollicare. Legumen stipitatum, 5–8 poll. longum, 6–9 lin. latum, maturum tamen non vidi.

21. C. SELLOI, fruticosa volubilis, ramulis villosis, foliolis 3 ellipticis v. oblongis acuminatis subtus rufo-sericeis, racemis brevibus multifloris, bracteolis lanceolatis calyce multo brevioribus, vexillo vix pilosulo.

Hab. In Brasilia (media? v. australiore?) (*Sello*).

Affinis *C. arborescenti*, sed rami volubiles, folia et flores minores. Foliola 3–4 poll. longa, 15–18 lin. lata, apice abrupte acuminata. Calyx circa 7 lin. longus laxe pilosus. Corolla vix sesquipollicaris, vexillo dorso medio pilosulo. Legumen non vidi.

22. C. JAVITENSIS, caule lignoso alte scandente v. repente glabro, foliolis 3 ovatis ellipticisve acuminatis glabris v. subtus parce pilosulis, racemis brevibus paucifloris, bracteolis parvis lanceolatis, vexillo puberulo.

Neurocarpum javitense, H. B. K. Nov. Gen. et Sp. Amer. vol. vi. p. 409.

Hab. In Brasilia boreali ad ripas Rio Negro (*Spruce*, n. 1877 et 2029).

in ripa flum. Teramini prope Javitam (*Humboldt et Bonpland*), et in Guiana anglica (*Rob. Schomburgk,* coll. ii. n. 1000, *Rich. Schomburgk,* n. 1723).

Species vix satis nota. Specimina *Schomburgkiana* et *Spruceana* incompleta sunt, *Humboldtiani* non nisi fragmenta suppetunt in Herb. Mus. Par. A *C. arborescenti* differt glabritie, ramis tenerioribus, petiolis elongatis, inflorescentia brevi, bracteolis parvis. Flores *C. arborescentis.* Legumen non visum.

23. C. LEPTOSTACHYA, caule lignoso volubili alte scandente glabro, foliolis 3 ellipticis oblongisve acuminatis glabris, racemis elongatis tenuibus, floribus per paria distantibus, bracteis bracteolisque minimis linearibus, vexillo minute puberulo.

Hab. In Guiana anglica ad flumen Corentyn superius prope fines Brasiliensium (*Rob. Schomburgk,* coll. ii. sine num.), et in Surinamo (*Hostmann*) (fide racemo unico absque foliis).

Species inflorescentia distinctissima. Caules sæpe elevato-triquetri faciebus sulcatis, raro teretes. Petioli graciles, 3–8-pollicares. Foliola maxima 7–8 poll. longa, 2 poll. lata, alia dimidio minora, omnia longe et anguste acuminata. Racemi ad axillas solitarii v. ad nodos vetustos fasciculati, nunc 3–4-pollicares nunc pedales, rhachi tenui. Flores in speciminibus *Schomburgkianis* bipollicares, in *Hostmanniano* fere tripollicares.

** *Bracteolis ovatis coriaceis striatis calyces subæquantibus.*

24. C. AMAZONUM (Mart., Benth. in Ann. Mus. Vind. vol. ii. p. 115), caule fruticoso suberecto v. scandente glabro, foliolis 3 ovatis acuminatis glabris v. subtus pilosulis, racemis brevibus ramosis, bracteis pedicello multo brevioribus, bracteolis ovalibus coriaceis calyces subæquantibus, vexillo glabro v. vix minute tomentello.

C. acuminata, Benth. in Ann. Mus. Vind. vol. ii. p. 115.

Hab. In Brasilia boreali in locis sylvaticis fruticetisque ad ripas flum. Solimoes Rio Negro et Amazonum frequens.

Species habitu, foliis, floribus *C. arborescenti* sat similis et pariter variat caule suberecto v. scandente, foliolis majoribus v. minoribus latioribus angustioribusque, sed primo intuitu distinguitur bracteolis 9 lin. longis latis concavis coriaceis striatis apice obtusis v. interdum fissis calyci adpressis. Inflorescentia etiam sæpius ramosa. Legumen *C. arborescentis,* sed omnino maturum non vidi.

25. C. HOFFMANSEGGII, caule fruticoso elato suberecto glabriusculo, racemis petiolisque puberulis, foliolis ex obovato ovatis ellipticisve obtusis v. subacuminatis, racemis brevibus ramosis, bracteis ovatis pedicellum subæquantibus, bracteolis ovalibus coriaceis calyces subæquantibus, vexillo sericeo-pubescente v. villoso.

C. arborea, Benth. in Ann. Mus. Vind. vol. ii. p. 115 (non *C. arborescens,* Ait.).

Hab. In Brasilia boreali ad Para (*Siber in Herb. Mart.*), ad Rio Ma-

dura (*Herb. Mus. Petrop.*), et in Peruvia cisandina prope Mozobamba et Tarapoto (*Matthews*).

Species non satis nota *C. amazonum* valde affinis et forte ejus varietas. Differre videtur caule (ex *Siber* et *Matthews*) altiore arborescente, pube, bracteis majoribus numerosis plerisque 4 lin. longis, calyce paullo breviore, vexillo villosiore.

26. C. RACEMOSA (Benth. in Ann. Mus. Vind. vol. ii. p. 115), caule fruticoso glabriusculo, foliolis ovatis ellipticisve acuminatis coriaceis glabris v. subtus pubescentibus, racemis dense multifloris, bracteis pedicello vix brevioribus, bracteolis ovalibus coriaceis calycem subæquantibus, vexillo sericeo-pubescente v. villoso.

Hab. In Brasiliæ prov. Goyaz prope Natividade (*Pohl*).

Frutex v. arbor ramis diffusis *C. amazonum* affinis. Foliola magis coriacea, venis primariis parallelis crebrioribus. Racemi vulgo folia æquant v. superant, nunc fere pedales, a medio ad apicem dense floridi, bracteis numerosis 2–3 lin. longis. Flores *C. amazonum*, sed bracteolæ et calyces tenuiter tomentelli et vexillum molliter sericeum.

Supersunt species duæ a G. Don in ins. St. Thomæ lectæ, *C. racemosa* et *C. alba*, ejusd. Gard. Dict. vol. ii. p. 213, verosimiliter vel ad *C. glycinoiden* referendæ vel e genere excludendæ.

On the Cultivation of Mosses. By the Rev. H. H. HIGGINS. Communicated by N. B. WARD, Esq., F.L.S.

[Read February 3rd, 1857.]

I SEND a few particulars respecting the cultivation of Mosses, of which about two hundred and forty species have been planted in my bryarium, which is a glass case about 4 feet 6 inches long, 22 inches from back to front, and 26 inches in height. It is fitted with shelves, and has two doors, one of which is generally left only partially closed. The plants are in separate pots, and are never removed from the case, but are kept in the shade and frequently watered with a syringe. Care is taken to procure suitable kinds of soil; but in most instances the soil is sparingly used, the pots being more than half filled with drainage.

ANDREACEÆ.—*A. rupestris* flourished and fruited till the second season. If removed with a portion of the rock attached, it might last much longer.

SPHAGNACEÆ.—The pots were set in trays of water, and no soil was put into them. Six species, five of them in fruit, were planted, and did well for the first year. *S. acutiflorum* alone fruited the second year. They are now almost extinct.

PHASCEÆ.—From a fine patch of *P. nitidum* only one or two plants came up the second year.

WEISSIEÆ.—Seem permanent. *W. controversa* fruits profusely about a month before its usual time.

DICRANEÆ.—*Stylostegium cæspititium* from Ben Lawers soon perished. *Dicranum polycarpum* and *D. virens*, from the same locality, flourish; the former fruits vigorously. Eight other species, some of them Alpine, seem permanently established. *Leucobryum glaucum* does not alter in the least.

CAMPYLOPODEÆ.—*C. longipilus*, from Scotland, thrives; and the common species bears fruit.

POTTIEÆ.—*P. Heimii* dies rapidly. *P. truncata* fruits.

TRICHOSTOMEÆ.—*Tri. tophaceum* and *homomallum* disappear. The *Tortulæ* mostly do well, but the case contains no Alpine species. *T. ruralis* overgrows itself and dies.

ENCALYPTEÆ.—*E. vulgaris* fruited and disappeared. *E. ciliata* remains, but is barren. Two Alpine species from Ben Lawers are unhealthy.

HEDWIGIEÆ.—*H. ciliata* remains, but wants attention.

GRIMMIEÆ.—*G. pulvinata* is a charming little plant for cultivation, but must be kept rather dry. Several others do fairly. All the *Racomitria*, except two, flourish and are very ornamental.

ORTHOTRICHEÆ. — Tied upon small blocks of wood, and suspended, they live, and some of them bear fruit, but do not appear thoroughly healthy. *Zygodon Lapponicus* and *Z. Mougeotii* are on the wane. *Tetraphis pellucida* holds its own well, but does not fruit.

POLYTRICHEÆ.—*Pogonatum nanum* is gone. *P. aloides* and *P. urnigerum* grow, and fruit beautifully: even *P. alpinum* does better than many. The *Polytricha* have not succeeded well.

BRYEÆ.—*Aulacomnium palustre* is most desirable for cultivation; it grows freely, and the tall pseudopodia have been abundant and very interesting. *Leptobryum pyriforme* should be excluded if possible; it becomes a perfect pest, growing everywhere but in its own pot. *Bryum*: about twenty-four species of this genus grow in the case; the best are *B. nutans* and *carneum*, both of them very beautiful in fruit. *B. alpinum* retains its fine crimson colour. *B. julaceum* and *B. Zierii* both do well, whilst the common *B. argenteum* has been often changed, and is now given up. *B. roseum* has been disturbed a good deal, ♂ and ♀ specimens having been planted together to try if fruit would be produced; but as yet there is no appearance of fertility. *B. Marratii*, *B. calophyllum*, and *B. Warneum* are not healthy. *Mnium*: all that have been tried do well.

MEESIEÆ.—*Meesia uliginosa* puts forth setæ of prodigious length; a rather suspicious circumstance in respect of its congener *M. longiseta*.

FUNARIEÆ.—*Physcomitrium pyriforme*. The fruit in its season is so dense that not a leaf can be seen.

BARTRAMIEÆ.—*Bartramia*. All are included except *B. rigida*. *The best and most satisfactory* mosses for growing in cultivation. Nothing of the kind can exceed them in beauty of colour, growth, and fruit. *Catoscopium nigritum* is gone.

SPLACHNEÆ.—*S. ampullaceum* and *S. sphæricum* have been only lately received; but *Tetraplodon mnioides*, on the bones of a rabbit, has grown and fruited for two seasons most vigorously.

FISSIDENTEÆ are gems for cultivation. *F. adiantoides* is a portion of a specimen which has been in cultivation for twenty years. *Antitrichia curtipendula* is not healthy.

ISOTHECIEÆ.—The *Pterogonia* are weakly. The *Isothecia* flourish. *Climacium dendroides* has been very fine, but now droops. *Leskea sericea* and *L. polycarpa* are very beautiful. *L. latebricola* and *pulvinata* are fast disappearing.

HYPNEÆ.—Of *Hypnum* sixty species are included. They are not easily kept in order on account of their straggling habit. The vitality of the plant seems to leave the root and the centre, and to reside almost entirely in the extremities. If these be cut off, the plant will not throw up fresh shoots from the root, but perishes. In some instances I have therefore cut off and planted in fresh and suitable soil the extremities of the fronds; and these have made young and vigorous specimens. The experiment is however too recent to be considered conclusive. Many of the rare Alpine species have been tried, but most of them are in a sickly state. *H. Crista-Castrensis* seems to thrive, but does not form so handsome a plant as *H. uncinatum*. *H. loreum* becomes in appearance exactly like *H. squarrosum*. *H. atro-virens*, from Ben Lawers, is very beautiful. No *Hypna* fruit with me but those which are commonly found fertile; *H. cordifolium* is perhaps an exception.

OMALIÆ.—*O. trichomanoides* is healthy. *Neckera crispa* is tied to a flat stone and suspended; it is in a very satisfactory condition.

Hookerieæ.—*H. lucens* never changes: in winter and summer it is alike beautiful. It is now fruiting pretty freely.

Fontinaleæ.—*F. antipyretica* fails.

Hepaticæ.—*Riccia fluitans* grows in a very interesting way. *Targionia hypophylla* is gone. The *Marchantiæ* grow too freely. *Jungermanniæ*: I have had twenty-seven species; some of them, e. g. *J. tomentella*, *J. ciliaris*, *J. spinulosa* and *J. asplenoides*, are as beautiful as any plants in the case. Some of the species fruit profusely, pouring out a stream of silvery translucent fruit-stalks, tipped with little shining ebony heads, which, when expanded, show very remarkable hygrometric properties. *J. nemoralis* is covered with little dark-coloured gemmæ.

Bartramia Halleriana grew last autumn with a fringe of *Hymenophyllum*, with which it was collected near Loch Lomond, and was as round and as finely in fruit as a bush of Mistletoe.

On the Structure of the Seeds of *Barringtonia* and *Careya*. By Thomas Thomson, Esq., M.D., F.R.S., F.L.S., Superintendent of the Calcutta Botanical Garden.

[Read March 17, 1857.]

The internal structure of the seeds of *Barringtonia* and *Careya* has long been a matter of doubt, and indeed continues to the present day to be described by different authors very differently, being by some regarded as exalbuminous, while others represent the embryo as lying in the axis of copious albumen.

The genus *Barringtonia* originated with Forster, but two of its species were known to Linnæus, and referred by him to the genera *Mammea* and *Eugenia* respectively. The descriptions of Linnæus, Forster and Lamarck do not refer to the internal structure; but as Jussieu* refers the genus to *Myrtaceæ*, an order which he describes as exalbuminous, he seems to imply a similar structure in *Barringtonia*.

Gærtner† (1791) describes *Barringtonia* as albuminous, but adds that the albumen adheres firmly to the entirely undivided embryo in which cotyledons and radicle are undistinguishable.

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* Genera, p. 326.

† Sem. ii. 97.

In 1826, Blume[*], without noticing Gærtner's description, ascribes to *Barringtonia* an exalbuminous seed, with a rugose undivided or pseudomonocotyledonous embryo. DeCandolle[†] in 1828 adopted the same view, but his description of the seed seems derived chiefly if not entirely from Blume.

The genus *Careya* was published for the first time by Roxburgh in 1819 in the third volume of the 'Coromandel Plants.' As the library of the Calcutta Garden does not contain a complete copy of this work, I have not at present access to Roxburgh's figure; but as the letter-press does not refer to the structure of the seed, it is probably not represented in the plate.

The earliest published account of the seed of *Careya* is that of Buchanan Hamilton[‡], in his commentary on the '*Hortus Malabaricus*' of Rheede, which appeared in 1827. He describes it as undoubtedly albuminous, with a straight terete central embryo, subacute at both ends, and as long as the albumen.

The second volume of Roxburgh's 'Flora Indica,' published in 1832, contains a detailed account of that botanist's observations on the seeds of both genera. In *Barringtonia*[§] he describes a copious albumen, with a simple embryo (without cotyledons) of the same length situated in its axis. He adds, however, several details, which seem to show that he considered the structure obscure and anomalous. In particular he tells us that the embryo forms the ligneous centre of the shoots, or, as he says a little lower down, the wood and pith, while the perisperm furnishes the cortical part and the leaves.

The seed of *Careya*[||] is described almost in the same terms as that of *Barringtonia*,—with a simple embryo as long as the copious albumen; and it is again stated that the embryo furnishes the centre or ligneous part, and the perisperm the cortical part of the young plant. It is added that the radicle issues from the small end of the seed close to the umbilicus, and the scaly plumule from the opposite end, a structure identical with that indicated as existing in *Barringtonia*, in which the solitary seed is pendulous, and the root is developed from the apex of the fruit; or in modern botanical terms, the radicle is next the hilum and the seed anatropous.

In 1834 Wight and Arnott[¶] describe the seeds of both genera as exalbuminous, with the large embryo not separable into cotyledons and radicle, but formed of two concentric homogeneous combined layers. As these authors possessed no ripe seeds, this character is an inference from a careful comparison of Gærtner's figure and description with the descriptions of Roxburgh and Blume, and perhaps with Roxburgh's drawing in the India House. As the result of this comparison, they state that they have no doubt that the structure in both genera is identical, and that the supposed albumen is part of the embryo, while no real albumen exists.

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[*] Bijd. 1096.

[†] Prodr. iii. 288.

[‡] Linn. Trans. xv. 96.

[§] Fl. Ind. ii. 635.

[||] Fl. Ind. ii. 638.

[¶] Prodr. Fl. Ind. p. 334.

In 1839–40 Endlicher ('Genera Plantarum') ascribes to both genera an exalbuminous embryo united with the cotyledons into a homogeneous fleshy mass, and makes no allusion to the double layer clearly indicated in Gærtner's figure, and described by Roxburgh and Wight and Arnott.

In 1841 Wight, returning to the subject in the second volume of the 'Illustrations*,' abandons the views which are given by Arnott and himself in the 'Prodromus,' and says that Roxburgh correctly describes the seed as having a simple inverse embryo the length of the ample perisperm.

In 1853 Lindley†, following Hamilton, Roxburgh and Wight, ascribes to the tribe *Barringtonieæ* an embryo in the axis of copious fleshy albumen.

Griffith's excellent observations on these anomalous seeds were not published till 1854‡, and consist only of the rough notes attached to the drawings; the subject, though too important to be entirely neglected by so indefatigable an observer, having only come before him cursorily, so that the notes made at one time are somewhat at variance with those at another. His remarks are so important that I shall quote them at length. At page 657 of the work quoted he says, "The seed of *Barringtonia* is sufficiently remarkable: I imagine the central part represents above the radicle, below the plumule; and I also imagine that all the part between the lowest scales of the superficies and the radicle is adherent cotyledon. Or is it an instance of an immense radicle and two or several minute cotyledons (represented by scales and an inconspicuous plumule)? To this, which is suggested by the radicular central system being internal, not reaching the superficies, there is a great objection in the irregularity, in number and situation, of the scales. The internality may arise from the cotyledons being produced into basilar auriculæ, concealing and enclosing the roots, as occasionally happens. The development only will clear up the point, for even if the scales become enlarged and foliaceous during germination, they will not, I think, necessarily become plumulary, some cotyledons during germination becoming decidedly leafy. On the whole this peculiar embryo appears to me distinctly analogous to that of *Dracontium*, and in a less degree to that of *Cryptocoryne*."

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* p. 19. t. 100.

† Veg. Kingd. 754.

‡ Notulæ, vol. iv.

In the illustrations to the fourth volume of Griffith's 'Notulæ,' t. 636. f. 1 represents a longitudinal section of a ripe seed of *Barringtonia conoidea*, Griff., and in the description of the plates he refers to a central and peripherical system, at the plumular end of the latter of which two small notches are seen. Fig. 2 of the same plate shows a similar section of *B. racemosa*, and shows at *b*, *b* the primary or first-formed scales, and at *c*, *c* the secondary-formed scales.

In plate 634 A the four figures in the left upper corner represent longitudinal sections of the seed of *Careya herbacea*, Roxb. The references to the letters are found in the 'Notulæ*.' In the general description of the plant he gives it white fleshy albumen and an undivided central embryo united to the albumen. In the references, however, he has evidently in view the above-quoted general remarks on *Barringtonia*, calling the notches at the plumular end of the peripherical system cotyledons, and adding above, "at first the long section shows only two notches, then it shows four, the two last nearly enclosing the plumule†."

In 1855 Miquel‡, following Blume and Endlicher, gives to both genera an exalbuminous embryo, in which cotyledons and embryo are blended into a homogeneous mass.

From the preceding details it will be seen that Gærtner, Blume, Hamilton, Roxburgh, Wight, and Griffith are the original authorities, from whom all systematists have copied, and that there are three distinct modes in which the structure has been viewed:—

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* iv. 661.

† An earlier view taken by Griffith, in reference to the seed of *Careya*, is given in the abstract of a paper by him, dated July 1st, 1835, and published in the 'Proceedings of the Linnean Society,' vol. i. pp. 280–1. In this abstract, after describing both the seed and its germination, it is said:—"The absolute nature of the outer fleshy part, Mr. Griffith observes, can only be determined by pursuing the development of the ovule. The nature of the subulate body is evident: it is the root, the true plumula being the minute scaly body at its distal end. The root points, as it should do, towards one side of the hilum, the situation in fact of the foramen. At the collet it is continuous with the plumula, and laterally with the outer fleshy mass, which ought therefore to be cotyledonary, and taking it to be so, might be explained by supposing the cotyledons to be affixed in a peltate manner, and united into a solid mass." There is little essential difference between this view and that proposed by Blume and adopted by DeCandolle and Endlicher, in regard to *Barringtonia*.—SECR.

‡ Fl. Ned. Ind. i. 484.

1. As an undivided exalbuminous embryo, which is the statement of Blume, followed by Endlicher and Meisner.

2. As an embryo in the axis of copious albumen. This view originated with Gærtner, and was adopted by Hamilton, Roxburgh, Wight, and Lindley.

3. As an exalbuminous embryo in two layers, a view first promulgated by Wight and Arnott, and doubtfully adopted by Griffith.

The manifest contradiction involved in these different modes of describing the same parts in a seed of considerable size induced me to take the first opportunity of examining ripe and germinating seeds. This I have now been able to do for two seasons in the Calcutta Botanic Garden, and the structure is so simple, that it will require much less time to describe it than has been occupied in the enumeration of the views of previous observers.

An inspection of the ripe seed of *Barringtonia* or *Careya* shows at once that it is not perfectly homogeneous. A transverse section of any part of the seed presents, as in Gærtner's plate of *Barringtonia* and Wight's of *Careya*, two concentric layers, separated by a ring of darker-coloured tissue, which has an organic connexion with both layers. A longitudinal section, as is shown in Gærtner's, Wight's, and Lindley's plates, as well as in those of Griffith, exhibits the central body extending throughout the whole length of the seed, and surrounded by the supposed albumen, from which it is separated on either side by a narrow line of darker-coloured tissue. The shape of the central body is dependent on the shape of the seed, and therefore varies in different species of the two genera; but the relative position of the parts remains the same in all.

The microscope shows that both of these bodies consist of ordinary cellular tissue full of starch-granules; but that the separating layer, which is in organic connexion with both, consists of a very thin or almost single layer of delicate wood-cells (pleurenchyma) intermixed with barred and true (unrollable) spiral vessels.

The integuments of the seed are readily separable in *Careya*; they adhere somewhat firmly both to the fruit and the seed in *Barringtonia*, but can be detached with a little care from the embryo, most easily near the plumule. An examination of the surface of the embryo before germination shows that, except two minute and scarcely perceptible notches, first noticed by Griffith, at the extremity from which the stem is afterwards developed, the surface is perfectly uniform.

Roxburgh's MSS. drawings in the library of the Calcutta Botanic Garden contain excellent figures of the germinating seeds of *Careya arborea* and *Barringtonia racemosa*. My examination of the germination of *Careya* has confirmed Roxburgh's observations, and I found that, allowing for difference of size and shape, the germination of *Barringtonia acutangula*, the species I examined, is exactly like that of *B. racemosa*, as figured by Roxburgh.

In all, the only appearances of foliar organs are a few minute scales surrounding the growing point, which is gradually elongated into the ascending axis. On this axis the earlier leaves are quite rudimentary, and true leaves are not developed till it has become one or two inches long.

A longitudinal section of a germinating plant shows that the central body is continuous with the pith, and the superficial body with the bark, as Roxburgh has long ago stated. It further shows that the vascular layer, which separates the two, is continuous both upwards and downwards with the ligneo-vascular cylinder of the stem and root.

It is thus evident: 1. That the embryo of *Barringtonieæ* is exalbuminous. 2. That the cotyledons are rudimentary. 3. That the embryo is an axial organ, consisting of pith, woody layer, and bark. 4. That the plumule, at best almost without scales, is developed into a stem, while the opposite extremity elongates into a root.

In examining nearly a hundred germinating plants of *Careya arborea*, I found that in a considerable number (eight or ten instances) the primary axis died off, and the stem was continued by a bud springing from the axil of one of the minute scales. In one instance this took place so close to the embryo as to be apparently in the axil of one of the first pair of scales, or rudimentary cotyledons.

In describing the seeds of *Garcinia* and *Xanthochymus*, Roxburgh states that their structure is quite like that of the seeds of *Careya* and *Barringtonia*, except that the central portion (which he calls the embryo) is very slender, and that the permanent root proceeds from the base of the plumule, while that from the opposite end of the embryo soon perishes, or remains slender as compared with the other.

Such adventitious roots are of common occurrence also in *Careya*, so that the difference is even less than Roxburgh supposed. Circumstances prevented my examining germinating seeds of *Xanthochymus*, grown here for the purpose last year, but I hope to be able to do so before the end of the present season.

Explanation of Plate I. A.

Fig. 1. Germinating plant of *Careya arborea*, Roxb.
Fig. 2. Another plant of the same, with the seed cut longitudinally.
Fig. 3. Germinating seed of *Barringtonia racemosa*, Blume, after Dr. Roxburgh's drawing.

Note on some young plants of *Cardamine hirsuta*, growing from buds formed on the upper surface of old leaves of that plant, exhibited March 3rd and 17th, 1857. By Miss Llewelyn of Penllergare, near Swansea. Extracted from a Letter to G. Bentham, Esq., F.L.S.

[Read March 17th, 1857.]

In January 1857 I observed a number of small leaves strewn about on a flower-bed, some green and some purple; on examining them I found that they were all growing by means of small, white fibrous roots—protruded in several places from the upper surface of the leaf, which is usually turned down on the earth. In many instances young leaf-stalks and small leaves were formed, all attached to the parent leaf, which appears to be that of *Cardamine hirsuta*, L.

A large plant of this weed was destroyed in the same bed, in September 1856, when leaves were broken off and accidentally scattered around.

Since January I have observed many instances of the same leaf-plants in other parts of the garden; and in one other instance I can trace the young weeds to the same cause.

Penllergare, March 3rd, 1857.

Memorandum by George Bentham, Esq.

These very curious specimens appeared mostly to be the larger, and especially the terminal, segments of the leaves of *Cardamine hirsuta*, and the young plants were generally growing from the upper surface close to the junction with the petiole, with here and there a few tufts of roots from other parts of the surface; but in some specimens there were two or three young plants growing from scattered points on the surface of the segment.

Præcursores ad Floram Indicam. By J. D. Hooker, Esq., M.D., F.R.S. & L.S., and T. Thomson, Esq., M.D., F.R.S. & L.S.

(Continued from page 29.)

Series II. Saxifrageæ (including *Hydrangeæ*, &c.), Crassulaceæ, Droseraceæ, Parnassieæ, Grossularieæ, Hamamelideæ, and Philadelpheæ.

The Orders here grouped together appear to us to stand in more immediate connexion with one another than with any other Indian Orders, and to be intimately connected with *Corneæ* and its allies on the one hand, and *Rosaceæ* on the other. From *Corneæ* and its allies they differ much in the structure and number of their ovules, which are numerous, except in some *Hamamelideæ*, and in their less constant characters of the carpels being partially free from one another and from the calyx or apex of the peduncle, the rarely valvate floral envelopes, and the more numerous stamens. From *Rosaceæ* they are less definitely though more naturally separated, and the Himalayan genera *Neillia* and *Astilbe* form a very close connecting link between these Orders. Of these, *Neillia* may safely be referred to *Saxifrageæ*; and *Astilbe* must, technically, fall into *Saxifrageæ* also, though its relationship to *Spiræa* is all but generic. *Polyosma*, appended by Brown and Bennett to *Escalloniea*, presents the strongest resemblance to *Corneæ* in many respects.

We have endeavoured to give a conspectus of these Orders, with their diagnostic characters drawn from the Indian genera, from which it will be seen, that though all of them are very natural groups, they are to a great extent undistinguishable by characters. *Saxifrageæ*, by being made to include the fruticose genera *Adamia*, *Hydrangea*, *Itea*, and *Polyosma*, has a very different value from the succeeding Orders, which are all of them as naturally parts of *Saxifrageæ* as many of the genera included under it are. *Philadelpheæ* might without violence be brought next to *Hydrangea*; *Parnassia*, though exalbuminous, is nearly related to *Saxifraga* itself, as indicated by Brown and others, and displays the same singular economy of the stamens advancing by pairs to the stigmata, the same texture of its persistent petals, and a habit so similar, that when in the Himalaya, their close affinity appeared to us self-evident. *Hamamelideæ* might be brought under *Cunoniæ*, the remarkable stipules of *Bucklandia* finding an exact homologue in *Cunonia* itself, whilst amongst other genera of both Orders many cross affinities may be traced. *Droseraceæ* and *Grossularieæ* seem to us to be rather aberrant members of *Saxifrageæ* in its extended significance, than separate Orders; the former having many points in common with *Saxifrageæ*, as the persistent marcescent subperigynous petals, which, and the stamens, are absolutely perigynous in some Antarctic species, indicating, as it appears to us, stronger affinities with this group than M. Planchon admits in his able paper on the genus*. It is not, however, our intention to discuss such questions at length in the "Præcursores;" and we therefore proceed with the systematic arrangement of the genera and species.

DIAGNOSES ORDINUM AD GENERA INDICA RECENSENDÆ.

I. SAXIFRAGEÆ. *Calyx* superus v. inferus. *Petala* valvata v. imbricata. *Stamina* 4–20, epigyna v. perigyna. *Ovarium* 1–10-loculare, stylis connatis v. distinctis. *Fructus* capsularis v. baccatus, 1–10-locularis, placentis axillaribus, suturalibus, parietalibusve. *Semina* albuminosa.—Habitus, folia *et* inflorescentia *varia*.

II. PARNASSIEÆ. *Calyx* semi-superus v. inferus. *Petala* 4–5, imbricata. *Stamina* 4–5, perigyna, staminodiis alternantia. *Ovarium* 1-loculare, placentis 3, parietalibus; *stylis* 3, v. 1, trilobo. *Capsula* coriacea. *Semina* exalbuminosa.—Herbæ *glaberrimæ, temperatæ*; foliis *radicalibus*; scapis *foliatis*, 1-*floris*; floribus *hermaphroditis*.

III. DROSEREÆ. *Calyx* inferus, 5-lobus, v. 5-partitus. *Petala* 5, subhypogyna, imbricata. *Stamina* 5, subhypogyna. *Ovarium* 5-loculare, placentis 3–5 parietalibus; *stylis* 3–5. *Capsula* 3–5-valvis, valvis medio placentiferis. *Semina* albuminosa.—Herbæ *temperatæ et tropicæ, pleræque glanduloso-pilosæ*; foliis *omnibus radicalibus circinatis*; scapis *ebracteatis*; floribus *racemosis, hermaphroditis*.—Habitus, &c. *Aldrovandræ* peculiaris.

IV. GROSSULARIEÆ. *Calyx* superus, tubo supra ovarium producto, 4–5-fido. *Petala* 4–5, fauce calycis inserta, parva, imbricata. *Stamina* 4–5, cum petalis inserta. *Ovarium* 1-loculare, placentis 2–4 parietalibus v. semiseptis adnatis; *stylis* 2–4, distinctis. *Bacca* pulposa. *Semina* albuminosa.—Frutices *temperatæ, sæpius glandulosæ*; foliis *alternis, vernatione plicatis*; floribus *racemosis subsolitariisve, hermaphroditis v. polygamo-dioicis*.

V. HAMAMELIDEÆ. *Calyx* semi-superus, lobis 5–7. *Petala* 4–5 v. 0, calyce inserta, sæpius ligulata, imbricata v. basi valvata. *Stamina* 5 v. plura, calyce inserta. *Ovarium* biloculare, ovulis 1

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* Ann. Sci. Nat. sér. 3. vol. ix. p. 90.

v. numerosis, placentis axillaribus adnatis; *stylis* 2. *Capsula* bipartibilis v. bifida, epicarpio soluto. *Semina* albuminosa.—Frutices *v.* arbores *temperatæ et subtropicæ*; pilis *plerisque stellatis*; foliis *alternis, stipulatis*; floribus *racemosis v. capitatis, calycibus interdum coadunatis, hermaphroditis v. unisexualibus.*

VI. PHILADELPHEÆ. *Calyx* superus, 4–5-fidus, lobis valvatis. *Petala* 4–5 disco epigyno inserta, convoluta v. valvatim induplicativa. *Stamina* 10 v. plura, cum petalis inserta, filamentis planis. *Ovarium* 3–10-loculare, placentis angulo centrali adnatis; ovulis numerosis; *stylis* 3–5, filiformibus, liberis v. connatis. *Capsula* vertice septicide v. loculicide dehiscens. *Semina* albuminosa; testa membranacea, laxa, ultra nucleum producta.—Frutices *temperatæ*; pilis *dum adsunt sæpe stellatis*; foliis *oppositis, exstipulatis*; floribus *albis, trichotome cymosis v. paniculatis, hermaphroditis.*

VII. CRASSULACEÆ. *Calyx* liber 3–20-partitus, lobis imbricatis persistentibus. *Petala* totidem perigyna, imbricata v. valvata, libera v. gamopetala. *Stamina* 6–20 cum petalis inserta v. iis adnata. *Squamulæ hypogynæ* tot quot ovaria, iis oppositæ, rarius 0. *Ovaria* tot quot petala et iis opposita, verticillata, libera v. rarius syncarpa, 1-locularia, placentis marginalibus. *Capsulæ* folliculares, liberæ. *Semina* minima, scobiformia, albumine tenuissimo v. 0.—Herbæ *carnosæ*; caule *v.* rhizomate *interdum lignoso*; foliis *oppositis alternisve, exstipulatis, interdum compositis*; floribus *hermaphroditis, rarius unisexualibus, plerisque cymosis racemosisve.*

I. SAXIFRAGEÆ.—DIAGNOSES GENERUM.

A. HERBACEÆ.

1. SAXIFRAGA, *L.* *Calyx* liber v. basi ovarii adnatus, sepalis imbricatis. *Petala* 4–5, perigyna. *Stamina* 10, perigyna. *Ovarium* 2–3-loculare; *stylis* 2–3, liberis.—Herbæ *temperatæ et alpinæ pleræque cæspitosæ*; foliis *alternis, exstipulatis.*

2. VAHLIA, *Thunb.* *Calyx* ovario adnatus; lobis valvatis. *Petala* et *stamina* 5, epigyna. *Ovarium* 1-loculare, placentis geminis pendulis; *stylis* 2.—Herbæ *tropicæ*; foliis *oppositis, exstipulatis.*

3. CHRYSOSPLENIUM, *L.* *Calyx* ovario adnatus, 4–5-fidus. *Petala* 0. *Stamina* 8–10, disco epigyno inserta. *Ovarium* 1-loculare, placentis 2, prope basin ovarii insertis; *stylis* 2.—Herbæ *temperatæ et alpinæ*; foliis *oppositis alternisque, exstipulatis.*

4. Tiarella, *L.* *Calyx* campanulatus, basi imo ovarii adnatus; lobis 5, valvatis. *Petala* 5, perigyna. *Stamina* 10, perigyna. *Ovarium* biloculare, placentis basi dissepimenti adnatis; *stylis* 2. —Herba *temperata*; foliis *plerisque radicalibus.*

5. Astilbe, *Ham.* *Calyx* basi ovario adnatus, lobis imbricatis. *Petala* 4–5, perigyna, v. 0. *Stamina* 8–10, perigyna. *Ovaria* 2, libera; placentis suturalibus.—Herbæ *elatæ*; foliis *alternis, compositis, stipulatis.*

B. Frutices v. Arbores.

6. Neillia, *Don.* *Calyx* basi ovario adnatus, lobis 5, valvatis. *Petala* 5, perigyna. *Stamina* numerosa, perigyna. *Ovarium* 1, 1-loculare; placenta suturali.—Frutices *temperatæ*; foliis *alternis, stipulatis, lobatis.*

7. Hydrangea, *L.* *Calyx* superus, floribus sterilibus petaloideus, fertilibus 4–5-dentatus. *Petala* epigyna, valvata. *Stamina* 8–10, epigyna. *Ovarium* inferum 2-loculare; placentis dissepimenti marginibus adnatis; *stylis* 2. *Fructus* capsularis.—Frutices *v.* arbores *temperatæ*; foliis *oppositis, exstipulatis.*

8. Adamia, *Wall.* *Calyx* superus, 5-dentatus, sinubus latis. *Petala* 5, epigyna, sessilia, valvata. *Stamina* 10, epigyna. *Ovarium* incomplete 3–5-loculare, placentis semiseptorum marginibus adnatis; stylis 3–5. *Bacca* 1-locularis; placentis 3–5 parietalibus.—Frutex *temperata*; foliis *oppositis, simplicibus, serratis.*

9. Polyosma, *Blume.* *Calyx* superus, 5-lobus. *Petala* 4, epigyna, linearia, valvata. *Stamina* 4, epigyna. *Ovarium* 1-loculare, placentis 2 parietalibus; *stylo* elongato; *stigmate* simplici. *Bacca* monosperma.—Arbores et frutices *tropicæ*; foliis *oppositis, exstipulatis.*

10. Itea, *L.* *Calyx* inferus, campanulatus, 5-fidus. *Petala* 5, perigyna, valvata. *Stamina* 5, perigyna. *Ovarium* 2-loculare, placentis juxta medium dissepimenti utrinque biseriatis; *stylo* simplici demum bipartibili. *Capsula* bipartibilis.—Arbores *subtropicæ*; foliis *alternis, exstipulatis.*

11. Pileostegia (*H. f. & T.*). *Calyx* semisuperus, obconicus, 4–5-lobus. *Petala* 4–5 calyce inserta, valvata, calyptratim subcohærentia. *Stamina* 8–10 cum petalis inserta. *Ovarium* 5-loculare; ovulis numerosis elongatis, ex apice loculi pendulis; *stylo* crasso clavato, stigmate 5–6-sulcato truncato apice 5–6-lobo, ad angulos lineis 5–6 longitudinalibus stigmatiferis instructo.

Fructus?—Arbor *v.* frutex *ramulis subteretibus*; foliis *oppositis, exstipulatis, coriaceis*; inflorescentia *terminali cymoso-paniculata, ramis decussatim oppositis*; floribus *pedicellatis, subfasciculatis.*

1. SAXIFRAGA, *L.*

With the solitary exception of *S. ligulata*, which is found also in the Khasia Mountains, all the Indian species are natives of the temperate and alpine regions of the Himalaya and Tibet, affecting precisely similar situations to what they do in Europe and the Arctic regions; and several of the species, as *S. hemisphærica, imbricata, saginoides*, and *Jacquemontiana*, attain the extremest limit in altitude of vegetation. The number of species seems to increase in the Eastern Himalaya, 28 being found to the eastward of Central Nipal, and only 24 to the westward of that meridian, of which latter several are not found west of Kumaon, whilst the unexplored Eastern alpine regions of Bhotan, Abor, &c. may be expected to yield many novelties. Of the Himalayan species we have referred seven to European ones, with tolerable confidence; they are, *S. flagellaris, granulata, cernua, Sibirica, orientalis, oppositifolia*, and *Hirculus*, of which all but the first and last are exclusively Western Himalayan. The remainder, with the exception of *S. ramulosa*, which approaches *S. cæsia* and *aretioides*, and *S. ciliata*, which is closely allied to the Siberian *S. crassifolia*, are all very distinct from the species of other countries.

The following synopsis of the Indian Saxifrages requires a little prefacing. We do not offer it as being at all likely to be uninfluenced as to its results by future discoveries. Saxifrages are more numerous in species and as frequent in individuals, in the Himalaya as in the Alps and Pyrenees, and analogous differences in opinion as to what should be considered distinct types amongst these, will be encountered by Indian botanists, when the suites of Himalayan specimens are as copious and accessible as the European are. It is true that the most puzzling group of all, the divided-leaved *Dactyloides*, does not perhaps exist in the Himalaya, but it is compensated for by the number and abundance of the *Hirculus* section, which is apparently scarcely less variable. Our materials have been three different times very carefully studied, at distant intervals; and the results of the second and third examinations have led to almost identical conclusions as to the number and limits of the forms. These limits are no doubt in some cases artificially drawn; the absence of connecting links in our collections, the de-

ficiency of specimens in different stages of development, and from different conditions of soil, climate, &c., the oversight of minute but permanent and natural characters, and the over-estimate of more conspicuous but less constant unimportant ones, are, after all, though the common, not the only, or in all cases the most numerous causes of diversity of opinion as to specific limits in such a genus. The subtler sources of error are, preconceived notions originating with the circumstances under which the specimens are first brought before us, alive or dried, and dominant ideas founded upon a previous study of the genus in other parts of the world. In short, all the advantages which a skilled naturalist derives from familiarity with his subject under other phases—from a full knowledge of the labours of others, and from having himself studied the majority of his materials in their native localities—have concealed within them certain sources of errors in judgement which influence the results of the closest observer and most skilful reasoner.

Such being the case, we feel that something is required of us beyond the simple assurance that we have given a more than average amount of careful comparative and microscopic study to so difficult a genus; we have, in the next place, well compared our forms with the identical, analogous, and representative species of Siberia, Europe, and North America; and we have collected almost all our Scotch Saxifrages, and studied those of the Alps a little in their native localities. We have carefully examined numerous specimens from almost all Indian collectors, and 35 out of the 39 species have been gathered by one or both of us, many of them in numerous localities. Having upon these data formed an approximate estimate of the limits of the Himalayan forms, and found that they allowed much latitude for difference of opinion as to a very considerable proportion of the species, we sought some European standard work with the views of which our Indian results might on the whole accord; and have selected Koch's 'Flora Germanica,' as being that which best represents our ideas of the limits of the European forms. Whether all these forms of European or Indian Saxifrages are to be considered specific, is quite another question, and one which we cannot solve; all we can do with propriety is to indicate what seem most marked, and what least so.

To put this matter in a practical form, we may say, that if we carried out what appears to us the most extreme views that could possibly be adopted towards uniting forms, we should reduce the Indian Saxifrages to 26, by uniting as varieties, the three of the

Bergenia group; *ramulosa* and *imbricata*; *granulata, cernua,* and *odontophylla*, with possibly *Sibirica*; *stenophylla* and *flagellaris*; *brachypoda* and *fimbriata*; *palpebrata* and *cordigera*; *saginoides* and *Hirculus*; *corymbosa, diversifolia,* and *latiflora*; *Jacquemontiana* and *Stella-aurea*; between some of which we find intermediate specimens do occur, and between others such may be found in future.

On the other hand, it would probably meet the views of those who take the extreme opposite view, to extend the species founded on our materials to 47, by dividing *ligulata* and *Stracheyi* each into two; the same with *ramulosa, imbricata, flagellaris, corymbosa, Hirculus,* and *diversifolia.* Of all these, we think the varieties of *Stracheyi* and *corymbosa* best entitled to reconsideration.

From this it appears that nearly half the forms we have examined are extremely variable; but the difficulty does not end here, for of the 26 most distinct forms, upwards of half have been gathered in one province alone, most of them by one individual, and in one or a few spots only; and no one can predicate the direction or limits within which they will prove variable when all their forms shall have been studied.

We have not attempted to give detailed descriptions of the species, and our diagnoses are little better than indications of the most prominent differential and other characters which the forms present. Whatever views may be taken of the limits between the species, as here proposed, there can be none about the certainty, that other specimens of them from different quarters of the Himalaya will greatly influence their diagnoses and render detailed descriptions of them worthless. What we have endeavoured to do, is to give a correct systematized review of the genus as it is developed in India, in every case indicating the forms which those who attach a different value from ourselves to the word 'species,' may combine or keep separate.

Gen. I. SAXIFRAGA, *L.*

§ I. BERGENIA. *Rhizoma* crassum. *Folia* ampla; petiolo basi dilatato. *Calyx* 5-lobus, lobis obtusis erectis. *Petala* alba v. rosea v. purpurea.

1. SAXIFRAGA LIGULATA, *Wall.* (*in As. Trans.* xiii. 398). Foliis orbiculatis obovatisve basi cordatis integerrimis ciliatis, panicula glaberrima.

a. Foliis amplis utrinque glabratis, petiolis late orbiculatis. *S. ligulata,* Hook. Bot. Mag. 3406; Exot. Flora, i. t. 49.

β. *ciliata*, foliis amplis utrinque hirsutis, petalis ovatis. *S. ciliata*, Royle, Ill. 226. t. 49. f. 2; Hook. Bot. Mag. 4915.

γ. Foliis minoribus utrinque glabratis obovatis basi cordatis, petiolis brevibus, petalis obovato-cuneatis. *S. ciliata*, Lindl. Bot. Reg. 1843, t. 65?

Hab. Rupibus Himalayæ totæ temperatæ et subtropicæ, alt. 4000–10,000 ped. a Bhotan! *Griffith*; ad Marri! *Fleming.* Montibus Khasia, alt. 4000–5000 ped.! *De Silva*, &c. (fl. vere.) (v. v.)

Variat *foliis* 2 unc. ad pedalem diametro, margine integerrimo v. denticulato, paginis utrisque hirsutis glaberrimisve lævissimis v. punctatis; petiolis brevibus elongatisve robustis gracilibusve, basi longe v. breve vaginantibus, hirsutis glaberrimisve; *panicula* parce v. copiose dichotome ramosa, pedicellis brevibus v. elongatis; *floribus* paucis v. numerosis, $\frac{1}{3}$ ad 1 unc. latis; *calycis* lobis glaberrimis ciliatisve; petalis late obovato-orbiculatis cuneatisve, brevibus elongatisve, albis roseis v. subpurpurascentibus; *carpellis* 2–3; *stylis* erectis v. divaricatis.

2. Saxifraga Stracheyi (*Hf. & T.*). Foliis obovatis obovato-cuneatisve grosse crenatis basi angustatis non aut vix cordatis, panicula glanduloso-pubescente. (Potius forma alpina *S. ligulatæ.*)

α. Foliis obovatis ciliatis subtus punctatis. *S. ciliata*, Lindl. in Bot. Reg. 1843, t. 65? (Cf. *S. ligulata* γ.)

β. Foliis cuneato-oblongis supra medium profunde crenatis non ciliatis subtus epunctatis (forma valde distincta).

Hab. Regione temperata et alpina Himalayæ occidentalis, alt. 8000–14,000 ped. Kumaon! *Strachey & Winterbottom.* Simla! Kunawur! Kishtwar! et Kashmir! *Thomson* (fl. Jun.) (v. v.)

Var. β. in Tibetia occidentali temperata et alpina, alt. 10,000–15,000 ped. Zanskar! *Thomson.* (v. v.)

Habitus et characteres pleræque *S. ligulatæ*, sed minor, foliis angustioribus basi angustatis vix cordatis paniculaque glanduloso-pubescente. In var. β. flores fid. *T. MSS.* luteoli, in α. albi v. pallide rosei, iis *S. ligulatæ* omnino similes.

3. Saxifraga purpurascens (*Hf. & T.*). Foliis obovato-rotundatis integerrimis glaberrimis, panicula pauciflora corymbosa glanduloso-pubescente, calyce profunde 5-lobo, petalis obovato-oblongis purpureis, floribus nutantibus.

Hab. In Himalaya orientali temperata et alpina Sikkim! alt. 10,000–14,000 ped., *J. D. H.* (fl. Maio.) (v. v.)

Verosimiliter species distincta ob calycem profundius 5-lobum, sed habitu characteribusque pluribus cum *S. Stracheyi* convenit, differt foliis latioribus glaberrimis eciliatis integerrimisque, panicula pauciflora, floribus omnibus nutantibus, petalisque purpureis.—*Folia* 2–3 unc. longa, interdum obscure sinuata, sæpius impresso-punctata. *Scapus* 3–6-pollicaris. *Flores* $\frac{3}{4}$–1 unc. lati. *Calyx* glandulosus. *Petala* interdum longe unguiculata.

§ II. Porphyrion. Cæspitosi. *Folia* subopposita, parva, crasse coriacea. *Calyx* 5-lobus, lobis obtusis erectis. *Petala* purpurea v. rosea.

4. Saxifraga oppositifolia (*Linn. Sp. Pl.* 575). Dense cæspitosa, foliis imbricatis suboppositis oblongis obtusis ciliolatis, floribus sessilibus terminalibus erectis, petalis purpureis lineari-obovatis.—*D.C. Prodr.* iv. 17; *Smith, Engl. Bot.* t. 9.

Hab. Tibetia boreali-occidentali alpina. Nubra, alt. 15,000–17,000 ped.! *Thomson* (fl. Aug.) (v. v.)

Distr. Alpibus Europæ et Asiæ borealis, terrisque arcticis hemisphæriæ borealis.

Exemplaribus Europæis omnino congruit. *Carpella* 2–3.

§ III. Aizoonia. Cæspitosi. *Folia* alterna, imbricata, subsessilia, crasse coriacea, cartilagineo-marginata, sæpe porosa. *Flores* flavi v. albi. *Calyx* 5-lobus, lobis erectis.

5. Saxifraga ramulosa (*Wall. Cat.* 446). Foliis imbricatis rosulatis lineari-oblongis acutis v. mucronatis glaberrimis interdum foveolatis, pedunculis brevibus 1-floris calycibusque glanduloso-hirsutis.

α. Major, foliis $\frac{1}{3}$ unc. longis, interdum basi ciliatis, floribus $\frac{1}{2}$ unc. diam.

β. Minor, densius cæspitosa, foliis brevibus superne oblique truncatis apice foveolato, floribus parvis.

Hab. Himalaya occidentali temperata et subalpina; Kumaon et Garwhal, alt. 8000–12,000 ped.! *Blinkworth,* &c. Var. *β.* alt. 10,000–13,000 ped.! *Edgeworth,* &c. (fl. æstate.)

Saxifragæ cæsiæ et *aretioidi* affinis.

6. Saxifraga imbricata (*Royle, Ill.* 226. t. 49). Densissime cæspitosa, foliis brevibus arcte imbricatis breviter ovatis obtusis supremis apice truncato perforatis, floribus sessilibus, calyce glanduloso-pubescente.

α. Foliis ciliatis supremis v. omnibus apice perforatis et sæpius marcescentibus. *S. ciliata,* Walp. non Royle.

β. Foliis glabris supremis v. omnibus apice perforatis et sæpius marcescentibus.

γ. Foliis omnibus glaberrimis ovato-oblongis non perforatis.

δ. Foliis ciliatis non perforatis.

Hab. Regionibus alpinis Himalayæ totius et Tibetiæ, alt. 12,000–18,000 ped. a Sikkim! *J. D. H.*; ad Kashmir! *Jacquemont.* (fl. Jun., Jul.) (v. v.)

Species protea et verosimiliter forma alpina *S. ramulosæ.* Var. *δ.* ad *S. Jacquemontianam* tendet.

7. Saxifraga hemisphærica (*Hf. & T.*). Densissime cæspitosa, foliis arctissime imbricatis ovato-oblongis obtusis margine scariosis longe ciliatis, floribus minimis sessilibus, sepalis distinctis lineari-oblongis obtusis late scarioso-ciliatis, carpellis brevibus.

Hab. Himalaya orientali alpina; Sikkim locis aridis, alt. 16,000–18,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Species singularis hemisphæras parvas efficiens, ob foliorum margines scariosas argenteas crebre ciliatas facile distinguenda. *Petala* non visa, an ulla?—Habitus et folia *S. perpusillæ* subsimilia. *Filamenta* lineari-elongata plana.

§ IV. NEPHROPHYLLUM. In speciebus Himalaicis *caules* foliosi. *Folia* rotundato-cordata, sparsa, dentata v. lobata. *Flores* inter majores, paniculati. *Calyx* parvus, profunde 5-fidus, lobis erectis, basi ovario adhærens. *Petala* alba.

8. SAXIFRAGA GRANULATA (*Linn. Sp. Pl.* 577). Perennis, rhizomate bulbifero, caule simplici glanduloso-pubescente, foliis reniformi-rotundatis 5–9-lobatis crenatisve supremis 3–5-fidis, floribus paniculatis, calycis lobis oblongis obtusiusculis, petalis albis spathulato-obovatis ter brevioribus.—*D.C. Prodr.* iv. 35 (descript. styli except.); *Engl. Bot.* t. 500.

Hab. Himalaya occidentali subalpina et alpina, alt. 10,000–15,000 ped. Kumaon! et Garwhal! *Edgeworth, Strachey* et *Winterbottom.* Kunawur! *Royle.* Zanskar! Kishtwar! et Kashmir! *Thomson.* (fl. Jun., Jul.) (v. v.)

Distr. Europa tota temperata et Africa boreali.

Cum exemplaribus Anglicis omnino congruit.

9. SAXIFRAGA CERNUA (*Linn. Sp. Pl.* 577). Perennis, rhizomate bulbifero, caule simplici glabriusculo, foliis reniformi-rotundatis 5–7-lobis supremis oblongis bulbiferis (*i. e.* flores abortivos gerentibus), floribus solitariis paucisve, sepalis liberis oblongis obtusis, petalis albis obovato-spathulatis. (Certe forma alpina *S. granulatæ.*)—*D.C. Prodr.* iv. 37; *Engl. Bot.* t. 664.

Hab. Tibetia occidentali alpina, alt. 15,000–17,000 ped.! Ladak! Nubra! &c. *T. Thomson* et *H. Strachey.* (fl. Aug.) (v. v.)

Distr. Alpibus Europæ, Americæ borealis temperatæ, Asiæ borealis, terrisque Arcticis.

Exacte cum exemplaribus Scoticis quadrat.

10. SAXIFRAGA ORIENTALIS? (*Jacquin, Obs.* ix. t. 34). Annua, caule gracili ramoso puberulo, foliis reniformi-rotundatis acute et grosse 7–9-dentatis lobulatisve superioribus cuneatis acute 5-lobis, floribus terminalibus solitariis parvis, sepalis ovato-oblongis acutis, petalis spathulatis, stylis gracilibus, stigmatibus capitatis.—*Don in Linn. Trans.* xiii. 369.

Hab. Himalaya occidentali alpina. Kumaon, alt. 14,000–15,000 ped.! *Strachey* et *Winterbottom.*

Distr. Asia Minor, Syria, Caucaso.

Exemplaria pauca plantæ Asiæ orientalis simillima.

11. SAXIFRAGA ODONTOPHYLLA (*Wall. Cat.* 454). Perennis, glanduloso-pubescens, rhizomate bulbifero, caule simplici v. superne ramoso, foliis late reniformibus 7–12-lobulatis, lobulis latis rotundatis obtusis apiculatisve, floribus paniculatis racemosisve, sepalis lineari-oblongis.

Hab. Himalaya occidentali subalpina. Kumaon! *Blinkworth.* Kulu ad Rotang Pass, alt. 12,000 ped., *Edgeworth.* (fl. Aug.)

S. granulatæ similis, sed caule robustiore, foliis plerisque radicalibus latioribus reniformibus, lobulis pluribus et obtusis; foliis caulinis nullis v. paucis et majoribus; floribusque majoribus.

12. SAXIFRAGA SIBIRICA (*Linn. Sp. Pl.* 577). Perennis, rhizomate squamato, caule debili basi petiolisque pubescente superne ramoso, foliis radicalibus reniformi-rotundatis 3–7-lobulatis lobulis subacutis superioribus simplicibus lanceolatis v. 3-lobis, floribus paniculatis pedicellis remotis gracilibus elongatis calycibusque puberulis glabrisve, sepalis ovatis, petalis albis obovato-spathulatis.—*Don in Linn. Trans.* xiii. 365; *Sternberg, Saxif.* 23. t. 25.

Hab. Himalaya occidentali temperata. Kishtwar, alt. 8000–9000 ped.! *Thomson.* (fl. Jun.) (v. v.)

Distr. Omni Siberia, Caucaso, et America occidentali arctica.

§ V. ARABIDEA. *Caulis* v. *scapus* erectus, foliosus. *Folia* alterna, subcuneata, plana, dentata. *Flores* albi. *Calyx* liber, patens.

13. SAXIFRAGA STRIGOSA (*Wall. Cat.* 448). Hispido-pilosa, caule rigido glanduloso basi folioso superne foliato ramoso, foliis radicalibus rosulatis lanceolatis acutis grosse inæqualiter paucidentatis caulinis sessilibus oblongis, axillis supremis bulbiferis, flore subsolitario pedicello gracili, sepalis ovato-lanceolatis glanduloso-pilosis, petalis albis, ovario oblongo, stylis brevibus.—*D.C. Prodr.* iv. 41.

Hab. Himalaya centrali et orientali subalpina, alt. 9000–14,000 ped. Bhotan! *Griffith.* Nepal! *Wallich.* Sikkim! *J. D. H.* (fl. Jul.) (v. v.)

Herba spithamæa, rigida. *Folia radicalia* petiolata, 1–1½-pollicaria, *caulina* sæpe reflexa. *Rami supremi* ob bracteas bulbiferas patulas v. reflexas subsquarrosi. *Flos* sub ⅓ unc. diametr.; *sepala* et *petala* patentia.

§ VI. MICRANTHES. *Caulis* subnullus. *Folia* radicalia petiolata. *Scapus* paniculatus. *Calyx* basi ovario adhærens, conicus. *Petala* alba.

14. SAXIFRAGA MICRANTHA (*Edgew. in Linn. Trans.* xx. 50). Glabrata v. basi parce pilosa, foliis radicalibus longe petiolatis ovato-cordatis obtusis profunde crenatis, scapo nudo superne ramoso ad axillas foliato, pedicellis pubescentibus, floribus paniculatis minimis, capsulis majusculis oblongis stylis brevibus.

Hab. Himalaya temperata et subalpina. Kumaon, alt. 9000–10,000 ped.! *Edgeworth.* Sikkim, alt. 10,000–14,000 ped., *J. D. H.* (fl. Jul.) (v. v.)

Folia 1–1½ unc. longa. *Scapi* spithamæi et ultra. *Pedicelli* fructiferi elongati. *Calyx* basi conicus. *Petala* post anthesin crescentia, late obovata, interdum inæqualia. *Filamenta* plana, supra medium dilatata; antheris rotundatis. *Carpella* 2–3, punctata.

15. **Saxifraga pallida** (*Wall. Cat.* 450). Foliis radicalibus ovatis crenato-serratis dentatisve, scapo simplici v. ramoso glabro v. pubescenti-piloso, bracteis lanceolatis inferioribus interdum bulbiferis, floribus majusculis solitariis paniculatisve, calyce basi conico ovario adnato lobis demum reflexis, petalis albis ellipticis, filamentis linearibus, capsulis late oblongis, stylis brevibus.—*D.C. Prodr.* iv. 38.

Hab. Himalaya alpina. Kumaon! *Blinkworth*; alt. 14,500 ped.! *Strachey & Winterbottom.* Nepal! *Wallich.* Sikkim! alt. 13,000–17,000 ped., *J. D. H.* (fl. Jun.–August.) (v. v.)

Minor et robustior quam *S. micrantha.* *Petioli* lati, in laminam sensim dilatati. *Scapus* 1–10-florus, robustus v. gracilis. *Calycis* tubus interdum elongatus capsulam semivestiens, lobi forma varii. *Flores* ⅓–¾ poll. lati, albi. *Capsula* nunc ½ poll. longa, crassa, castanea; stylis 2 crassis recurvis.

§ VII. Hirculus. *Caules* foliosi. *Folia* varia. *Flores* lutei. *Sepala* libera, erecta v. demum patula v. reflexa.

a. Flagelliferæ. Stolones *filiformes.* Calyces *erecti, v. in* S. Brunoniana *patentes.*

16. **Saxifraga flagellaris** (*Willd. & Sternb. Rev. Sax.* 25. t. 6). Glanduloso-pubescens, stolonibus filiformibus apice proliferis, foliis lineari- v. ovato-lanceolatis glanduloso-ciliatis radicalibus rosulatis, caulinis numerosis, floribus corymbosis, sepalis lineari-oblongis erectis.

α. Foliis ciliatis serratisve mucronatis. *S. mucronulata*, Royle, Ill. p. 227.

β. Foliis spinuloso-ciliatis aristatis. *S. spinulosa*, Royle, Ill. p. 227. t. 50. f. 2.

Hab. Himalaya et Tibetia alpina, alt. 10,000–17,000 ped. a Sikkim! *J. D. H.* ad Kunawur! *Royle*, &c. Ladak! *Thomson.* (fl. Jul.) (v. v.)

Distr. Terra arctica hemisphæræ totæ borealis.

Caulis 1–6-uncialis. *Folia* ½–1½ unc. longa, glabra v. utrinque glandulosa, obtusa v. acuta. *Flores* erecti, flavi, subsolitarii v. corymbosi, interdum congesti. *Calyx* dense glandulosus. *Petala* magnitudine varia, 5–9-nervia.

17. **Saxifraga stenophylla** (*Royle, Ill.* p. 227. t. 50. f. 1). Glabrata, stolonibus filiformibus proliferis, foliis lineari-oblongis obtusis glabris v. obscure glanduloso-ciliatis inferioribus rosulatis, caulinis numerosis consimilibus, floribus solitariis corymbosisve, pedicellis calycibusque erectis glanduloso-pubescentibus.—Verosimiliter varietas *S. flagellaris.*

Hab. Himalaya occidentali alpina. Kumaon! 11,000–15,000 ped.! *Edgeworth, Strachey & Winterbottom.* Kashmir, *Royle.*

A *S. flagellari* differt, glabritie, et foliis obtusis v. vix mucronulatis, non aut vix ciliatis.

18. SAXIFRAGA PILIFERA (*Hf. & T.*). Glanduloso-puberula, stolonibus filiformibus proliferis, foliis brevibus lineari-oblongis obtusis radicalibus rosulatis, floribus parvis corymbosis, calyce basi hemisphærico lobis brevibus obtusis erectis, petalis calycem vix superantibus.

Hab. Himalaya orientali alpina. Sikkim, alt. 14,000–15,000 ped.! *J. D. H.* (v. v.)

Species parvula 2–4-uncialis. *Folia* $\frac{1}{4}$–$\frac{1}{2}$ unc. longa, crassiuscula. *Flores* iis *S. flagellaris* multoties minoribus, sub $\frac{1}{4}$ unc. latis, breve pedicellatis. *Calyx* brevis semisuperus. *Capsula* brevis, stylis crassis.

19. SAXIFRAGA BRUNONIS (*Wall. Cat.* 444). Glaberrima, stolonibus capillaribus non proliferis, caulibus subcæspitosis, foliis linearibus patentibus ciliatis aristatis nitidis, caulinis sparsis supremis interdum bulbiferis, caulibus gracilibus nitidis glaberrimis v. sparse glandulosis, floribus subsolitariis, calycibus glabris ovato-oblongis obtusis patulis petalis lineari-obovatis flavis multo brevioribus, capsula turgida stylis brevissimis.—*D.C. Prodr.* iv. 45.

Hab. Sylvis Himalayæ temperatæ et subalpinæ, alt. 7000–12,000 ped. Simla! *Madden*, &c.; Kumaon! *Blinkworth*, &c.; Sikkim, *J. D. H.* (fl. Jul., August.) (v. v.)

Indole florum ab aliis hujus subsectionis longe recedens, et *S. filicauli* proxime affinis.

b. TRACHYPHYLLUM. Estoloniferæ. Caules *subsimplices, foliosi.* Folia *parva, sessilia, radicalia vix ulla.* Flores *subsolitarii, terminales, pedicellati, flavi.* Calyx *patens v. reflexus.*

20. SAXIFRAGA FILICAULIS (*Wall. Cat.* 445). Hispido-glandulosa, caulibus subcæspitosis rarius simplicibus rigidis flexuosis, foliis omnibus sparsis alternis lineari-lanceolatis acuminatis scaberulis marginibus recurvis axillis supremis sæpe bulbiferis, floribus terminalibus solitariis pedicellatis sepalisque lineari-oblongis glandulosis, petalis obovato-spathulatis 3-nerviis, stylis gracilibus.—*D.C. Prodr.* iv. 46.

Hab. Himalaya occidentali temperata, alt. 7000–10,000 ped. Kumaon! *Blinkworth*, &c.; Simla! *Madden*, &c.; Kulu! *Edgeworth.* (fl. Aug., Sept.) (v. v.)

Caules spithamæi, basi bulbiferi. *Folia* $\frac{1}{3}$ unc. longa, subsquarrosa. *Flores* $\frac{1}{3}$–$\frac{1}{2}$ unc. lati.

21. SAXIFRAGA BRACHYPODA (*Don, Linn. Trans.* xiii. 378). Glaberrima, caulibus simplicibus foliosis, foliis nitidis erecto-patentibus reflexisve subulato-lanceolatis acuminatis basi cordato-semiamplexicaulibus integerrimis ciliatisve, axillis interdum bulbiferis, pedicello gracili terminali 1-floro glaberrimo v. glanduloso, sepalis ovatis acuminatis, petalis late obovatis flavis, stylis graciliusculis strictis.—*Don,*

Prodr. 209; *D.C. Prodr.* iv. 46. S. glandulosa, *Wall. Cat.* 442; *D.C. Prodr.* iv. 45.

Hab. Sylvis Himalayæ temperatæ et subalpinæ, alt. 9000–13,000 ped. Kumaon! *Blinkworth*; Nepal! *Wallich*; Sikkim! *J. D. H.*; Bhotan! *Griffith.* (fl. August.) (v. v.)

Habitus fere *Lycopodii* ob folia subimbricata interdum reflexa et deorsum imbricata. *Folia* ⅓ unc. longa; bulbillis interdum squarrosis. *Flores* ½ unc. diametr.

22. Saxifraga fimbriata (*Wall. Cat.* 443). Caule superne glanduloso hispidulo rigido simplici, foliis patentibus rigidis nitidis sessilibus subdensis subulato-lanceolatis aristato-acuminatis basi cordatis spinuloso-ciliatis axillis prolifero-bulbiferis, pedicellis rigidis terminalibus solitariis binisve sepalisque oblongis setoso-glandulosis, petalis late obovatis, stylis strictis graciliusculis.—*D.C. Prodr.* iv. 45.

Hab. Himalaya alpina et temperata, alt. 11,000–14,000 ped., Kumaon! *Blinkworth*, &c.; Nepal! *Wallich*; Sikkim, *J. D. H.* (fl. Jul.) (v. v.)

S. brachypodæ valde affinis sed major, foliis majoribus latioribus basi non semi-amplexicaulibus, cartilagineo-marginatis et longe spinuloso-ciliatis. *Flores* majores.

23. Saxifraga hispidula (*Don in Linn. Trans.* xiii. 380). Pubescenti-pilosa v. hispidula, caule gracili flexuoso laxe foliato, foliis sessilibus oblongo-lanceolatis acutis integerrimis v. grosse 1–2-dentatis utrinque pubescentibus axillis interdum bulbiferis, pedicellis solitariis terminalibus 1-floris sepalisque ovatis acutis hispido-glandulosis, petalis late obovatis calyce duplo longioribus.—*S. Evolvuloides,* Wall. Cat. 447; D.C. Prodr. iv. 46.

Hab. Himalaya centrali et orientali alpina. Nepal! *Wallich*; Sikkim, alt. 13,000–15,000 ped., *J. D. H.* (fl. August.) (v. v.)

Species distinctissima. *Caules* 4–6 unc. longi. *Folia* ½–⅔ unc. longa, 2 ad 2½plo longiora quam lata, opaca, sessilia, basi angustata. *Flores* ⅓ unc. lati, crocei.

c. Cæspitosi. Caules scapive *erecti, laxe foliati,* 1-*flori.* Folia, *non secus ramos omnes imbricata, radicalia petiolata, caulina sessilia.* Sepala *patula v. erecta.* Petala *flava* (*vide* S. Hirculus *in subsectione sequenti*).

24. Saxifraga palpebrata (*Hf. & T.*). Dense cæspitosa, glanduloso-pubescens, caulibus scapisve erectis 1-floris, foliis longe ciliatis radicalibus petiolatis spathulatis obtusis, caulinis sessilibus lineari-oblongis obtusis, flore subsessili majusculo, sepalis late oblongis obtusis ciliatis petalis obovatis aureis ½ brevioribus, ovario oblongo-conico, stylis brevissimis.—Ad *S. Hirculus* tendit.

Hab. Himalaya alpina. Kumaon, 13,000 ped., *Strachey & Winterbottom*; Sikkim, alt. 13,000–15,000 ped.! *J. D. H.* (fl. August.) (v. v.)

Species pulchella 2-3-uncialis, cæspites latos amplos floribus amplis opertos efficiens. *Folia* radicalia ½ unc. longa, caulina breviora longius ciliata. *Flores* lati, ⅓ unc. diametr.

25. Saxifraga cordigera (*Hf. & T.*). Dense cæspitosa, glanduloso-pilosa, caulibus scapisve erectis 1-floris, foliis longe ciliatis radicalibus petiolatis spathulatis obtusis caulinis ovato-cordatis, flore subsessili majusculo, sepalis late oblongis obtusis ciliatis petalis obovatis aureis ½ brevioribus, ovario late conico, stylis brevissimis.

Hab. Himalaya orientali alpina, Nepal et Sikkim, alt. 12,000–14,000 ped.! *J. D. H.* (fl. Aug.) (v. v.)

S. palpebratæ simillima, et vix differt, nisi foliis radicalibus longius petiolatis, caulinisque cordatis.

26. Saxifraga saginoides (*Hf. & T.*). Densissime cæspitosa, caulibus inter folia scapisque laxe pilosis, foliis densissime imbricatis anguste linearibus longe membranaceo-vaginantibus obtusiusculis recurvo-patentibus vaginis ciliatis, scapis brevibus 1-floris, foliis parvis linearibus sepalisque lineari-oblongis obtusis eglandulosis, petalis linearibus lineari-oblongisve sepalis paulo longioribus.

Hab. Himalaya alpina, Kumaon, alt. 13,000 ped.! *Strachey & Winterbottom*; Sikkim, alt. 14,000–18,000 ped.! *J. D. H.* (fl. August.) (v. v.)

Species submuscoidea, cæspites latos 1 ped. et ultra læte virides efficiens, floribus parvis aureis stellata. *Folia* glaberrima, coriacea sed non rigida, ¼–⅓ unc. longa, petiolo vaginante scarioso brunneo æquilongo, marginibus recurvis planisve. *Scapi* ¼ unc. longi, pilis brunneis laxe vestiti. *Flores* ⅙ unc. lati. *Ovarium* conico-oblongum, sæpe abortivum; stylis subulatis recurvis.—Inter formas minimas alpinas *S. Hirculi* perplurimas vidimus ab *S. saginoides* ægre distinguendas.

27. Saxifraga aristulata (*Hf. & T.*). Dense cæspitosa, caulibus scapisque laxe pilosiusculis, foliis radicalibus anguste linearibus rigidis nitidis integerrimis glaberrimis marginibus recurvis apice arista decidua terminatis, scapis unifloris superne glanduloso-pilosis, sepalis lineari-oblongis glaberrimis, petalis obovatis orbiculatisve.

Hab. Himalaya orientali alpina, Sikkim, alt. 16,000 ped.! *J. D. H.* (fl. Aug., Sept.) (v. v.)

Inter *S. saginoidem* et *S. Brunonis* et *S. filicaulem* oscillat. Habitus *S. saginoidis* et *S. Brunonis*, textura et flores *S. filicaulis* et *S. Brunonis*, sed capsula non inflata et folia non ciliata. A *S. saginoide* conspicue differt foliis rigidis, arista decidua terminatis, marginibus recurvis, scapis glandulosis petalisque latioribus.

28. Saxifraga Lychnitis (*Hf. & T.*). Cæspitosa, tota glanduloso-pilosa v. pubescens, foliis radicalibus ovatis breve petiolatis obtusis integerrimis caulinis sessilibus lineari-oblongis, flore magno nutante demum erecto, calyce oblongo atro-tomentoso segmentis erectis lineari-oblongis obtusis, petalis anguste lineari-elongatis.

Hab. Himalaya alpina, Kumaon, alt. 14,700 ped.! *Strachey & Winterbottom*; Sikkim, alt. 14,000–16,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Species distinctissima habitu fere *Lychnidis apetalæ*. *Color* luridus. *Scapi* exemplaribus e Kumaon pollicares, e Sikkim 4-pollicares. *Folia* radicalia conferta, ½ unc. longa, opaca, enervia; petiolo breviusculo membranaceo-marginato ciliato. *Scapus* firmus. *Flos* pro planta majusculus. *Calyx* ⅓ unc. longus, lobis tubo triplo longioribus. *Petala* marcescentia ½–⅓ unc. longa, interdum pollicaria et ligulata. *Stamina* filamentis filiformibus, antheris parvis. *Capsula* conico-oblonga, calyce inclusa, truncata, stylis 2 brevibus divaricatis terminata.

d. Cæspitosi. Caules scapive *erecti, laxe foliati, multiflori* (*in* S. Hirculus 1–3 *flori*). Folia *non imbricata, radicalia petiolata.* Sepala *in omnibus patula.* Petala *flava.*

29. SAXIFRAGA HIRCULUS (*Linn. Sp. Pl.* 575). Caule scapove superne laxe villoso, foliis radicalibus petiolatis lanceolato-spathulatis glaberrimis petiolis interdum ciliatis, caulinis sessilibus petiolatisve, floribus 1–3, sepalis late oblongis obtusis, petalis obovatis orbiculatisve, capsula conico-oblonga, stylis brevissimis divaricatis.—*D.C. Prodr.* iv. 45; *Engl. Bot.* t. 1009.

β. Petalis 5-nerviis basi nudis. *S. Hirculoides,* Dne. Plant. Jacq. 67. t. 78. fig. 1.

γ. Floribus dense corymbosis parvis, omnibus masculis ovariis imperfectis.

Hab. Himalaya orientali et Tibetia occidentali alpina. Kunawur, 15,000–16,000 ped.! *T. Thomson*; Sikkim, alt. 14,000 ped.! *J. D. H.*; Gugi, 17,000 ped.! *Strachey & Winterbottom*; Ladak! Nubra! &c., alt. 15,000–17,000 ped.! *Thomson*; Piti, *Jacquemont*. (fl. Jul.–Sept.) (v. v.)

Distr. Terris arcticis hemisphæræ totæ borealis, alpibus Europæ totius, Caucasi, Soongariæ.

30. SAXIFRAGA NUTANS (*Hf. & T.*). Caule erecto multifloro superne pedicellis calycibusque dense pubescenti-glandulosis, foliis radicalibus longe petiolatis elliptico-oblongis obtusis 3–5-nerviis ciliatis, caulinis sessilibus oblongis obtusis, floribus subracemosis confertis nutantibus, sepalis erectis lanceolato-oblongis glandulis atris, petalis spathulatis vel anguste lineari-oblongis obtusis pallide flavis.

Hab. Himalaya orientali subalpina. Sikkim, alt. 10,000–12,000 ped.! *J. D. H.* (fl. August.) (v. v.)

Species insignis, spithamæa, caule erecto foliato. *Folia* radicalia cum petiolo 2–3 unc. longa, laxe ciliata, interdum pilosula. *Racemi* terminales 7–12-flores. *Flores* fere ½ unc. longi. *Petala* calyce vix bis longiora. *Ovaria* exemplaribus nostris ut videtur imperfecta. *Stamina* inæqualia, filamentis filiformibus.

31. SAXIFRAGA VISCIDULA (*Hf. & T.*). Tota glanduloso-pubescens, caule inferne laxe piloso, foliis inferioribus petiolatis spathulato-lanceo-

latis subacutis, superioribus sessilibus oblongis, floribus solitariis corymbosisve, pedunculis calycibusque dense glandulosis, sepalis oblongis obtusis, petalis oblongo-spathulatis obtusis 5–7-nerviis marginibus eroso-ciliolatis glandulosis sepalis triplo longioribus.

Hab. Himalaya orientali alpina. Sikkim, alt. 13,000–15,000 ped.! *J.D.H.* (fl. August.) (v. v.)

Caulis 2–3-pollicaris, flexuosus, foliosus. *Folia* inferiora ¼ unc. longa. *Flores* pro planta magni, ½ unc. longi. *Petala* erecto-patentia glandulis marginalibus interdum atris. *Ovarium* breviter oblongo-conicum, stylis parallelis rectis.

32. SAXIFRAGA CORYMBOSA (*Hf. & T.*). Caule gracili laxe foliato inferne glaberrimo superne pedunculis pedicellisque sparse glandulosis, foliis radicalibus longe petiolatis ovato-lanceolatis glaberrimis v. sparse pilosiusculis, caulinis sessilibus semiamplexicaulibusque, floribus erectis corymbosis, sepalis patulis v. reflexis oblongis glaberrimis glandulosisve, petalis patentibus glaberrimis.

a. Foliis radicalibus latioribus pilosiusculis opacis, caulinis basi attenuatis, sepalis glandulosis v. glaberrimis.

β. Foliis nitidis radicalibus minoribus angustioribus, caulinis basi cordato-semi-amplexicaulibus, calycibus glaberrimis. An species diversa?

Hab. Himalaya orientali temperata et subalpina, Sikkim, alt. 10,000–14,000 ped.! *J. D. H.* (fl. August.) (v. v.)

Inter *S. Hirculum* et *diversifoliam* media: a priore differt præcipue caule superne pedicellisque non villosis sed glandulosis, floribus corymbosis;—a posteriore caulibus gracilibus, foliis angustioribus, floribusque multo minoribus.

33. SAXIFRAGA DIVERSIFOLIA (*Wall. Cat.* 452). Elata, caule robusto foliato superne glanduloso, inferne glaberrimo v. piloso, foliis longe petiolatis late ovatis lanceolatisve, caulinis late ovatis sessilibus, floribus corymbosis, bracteis calycibusque glandulosis, petalis obovatis ungue brevi basi interdum glanduloso-setosis.—*D.C. Prodr.* iv. p. 44; *Hook. Lond. Journ. Bot.* iv. p. 638. t. 21.

a. lanceolata (D.C. *l.c.*), foliis radicalibus elliptico- v. ovato-lanceolatis, caulinis ciliolato-glandulosis basi angustatis v. brevissime cordatis.

β. parnassiæfolia (D.C. *l. c.*), foliis radicalibus ovato-cordatis petiolis et pagina inferiore glabris v. hirsutis, caulinis late cordato-ovatis semiamplexicaulibus. *S. parnassiæfolia,* Don in Linn. Trans. xiii. 405 (male); D.C. Prodr. iv. 25.

γ. Moorcroftiana (D.C. *l. c.*), caule robustiore, foliis radicalibus ovatis cordatisve, caulinis late cordato-amplexicaulibus. *S. Moorcroftiana,* Wall. Cat. 453.

Hab. Himalaya tota subalpina et temperata copiosissime, a Sikkim! ad Kashmir! alt. 8000–15,000 ped. (fl. August., Sept.) (v. v.)

Planta variabilis, statura copiaque florum insignis.

34. Saxifraga latiflora (*Hf. & T.*). Caule erecto foliato sparse glanduloso-piloso, foliis radicalibus petiolatis ovato-ellipticis, caulinis majoribus amplis late ovatis basi angustatis sub-decurrentibus obtusiusculis, floribus solitariis paucisve maximis, calyce basi villoso, sepalis ovato-lanceolatis obtusis petalis ovato-oblongis paulo brevioribus.

Hab. Himalaya orientali alpina, Sikkim, alt. 12,000–14,000 ped.! *J.D.H.* (fl. August.) (v. v.)

S. *diversifoliæ* proxima et forma abnormis, sed foliis caulinis amplis et floribus fere pollicem latis diversissima.—*Caules* 4–5 unc. alti, robusti, glabriusculi. *Folia* radicalia pauca, parva; caulina 1½ unc. longa, ½–1 unc. lata. *Petala* glaberrima, basi non appendiculata. *Ovarium* et *stamina* ut in *S. diversifolia.*

35. Saxifraga umbellulata (*Hf. & T.*). Parvula, caulibus cæspitosis pedunculis pedicellis calycibusque dense glanduloso-pubescentibus, foliis carnosis densissime confertis rosulatis spathulatis glabriusculis, caulibus scapisve medio foliatis foliis glandulosis lineari-oblongis, superne corymboso-paniculatis, sepalis lineari-oblongis obtusis petalis obovatis dimidio brevioribus.

Hab. Himalaya orientali alpina, Sikkim, alt. 12,000–14,000 ped.! *J.D.H.* (fl. Jul.) (v. v.)

Species singularis *Crassulam* parvam referens, congeneri nulli affinis. *Caules* brevissimi, scapis foliatis pollicaribus. *Folia* valde carnosa, recurva, densissime rosulata, ⅓–½ unc. longa, glabra v. sparse ciliata, petiolo crassiusculo, lamina parva obtusa. *Scapus* ascendens, subrigidus, basi nudus, supra medium foliatus, foliis linearibus obtusis patulis glandulosis, ibi subumbellatim ramosus, ramis pedicellisve ½-pollicaribus flexuosis 1–2-floris interdum bracteatis. *Flores* erecti, aurei, sub ¼ poll. lati; petala erecto-patentia. *Ovarium* breve, stylis brevibus.

e. Caules *dense cæspitosi ramosi, foliis imbricatis parvis crassiusculis densissime obtecti.* Flores *solitarii, flavi, terminales, sessiles, v. pedicello nudo.* Sepala *patula v. reflexa, rarius erecta.*

36. Saxifraga Jacquemontiana (*Dne. in Plant. Jacq.* 68. t. 78. f. 2). Densissime cæspitosa, glanduloso-puberula, foliis sessilibus dense imbricatis lineari-oblongis apice rotundatis glanduloso-ciliolatis pubescentibusque, floribus sessilibus pedicellatisve pedicello calyceque reflexo glanduloso, petalis lineari-oblongis, ovariis stylisque brevibus.

Hab. Himalaya alpina. Lahul! *Hay*; Kunawur, *Jacquemont*; Kumaon! 13,000 ped., *Strachey & Winterbottom*; Sikkim, alt. 15,000–18,000 ped.! *J. D. H.* (fl. August., Sept.) (v. v.)

Radix cæspitibus vetustioribus sublignosus, elongatus, divisus. *Rami* 1–2 poll. longi, cum foliis ¼ unc. diametr. *Flores* expansi ramis paulo latiores.

37. SAXIFRAGA STELLA-AUREA (*Hf. & T.*). Cæspitosa, ramis interdum elongatis foliis dissitis, glabra v. parce glanduloso-puberula, foliis laxe imbricatis carnosulis oblongis apice rotundatis glaberrimis ciliolatisve, pedicellis terminalibus subelongatis glanduloso-pubescentibus 1-floris, calycibus glaberrimis, sepalis oblongis obtusis patentibus demum reflexis, capsula brevi late conica, stylis longiusculis subrecurvis.

Hab. Himalaya et Tibetia occidentali alpina. Kumaon, alt. 14,000 ped.! *Strachey & Winterbottom*; Tibetia occid. ad Pangong, alt. 17,000–18,000 ped.! *H. Strachey* (15); Sikkim, alt. 15,000–17,000 ped.! *J. D. H.* (fl. Aug., Sept.) (v. v.)

S. *Jacquemontianæ* valde affinis, sed minor, glabrior, laxius cæspitosa, pedicellis longioribus, sepalisque non aut vix ciliolatis.

38. SAXIFRAGA MICROPHYLLA (*Royle in Herb. Benth.*). Perpusilla, glaberrima, laxe cæspitosa, foliis laxe imbricatis lineari-oblongis obtusis carnosulis, pedicellis terminalibus gracilibus unifloris glanduloso-puberulis, calyce hemisphærico, sepalis erectis glaberrimis coriaceis, petalis oblongis coriaceis sepalis æquilongis, antheris subexsertis, stylis brevibus.

Hab. Himalaya occidentali alpina. Kumaon! (*Royle*) ad Barji-kang, alt. 14,500 ped.! *Strachey & Winterbottom.*

Species omnium minima, cæspites pollicem latos efficiens. *Caules* laxe ramosi, $\frac{1}{4}$ unc. longi. *Folia* subfasciculata, $\frac{1}{8}$ unc. longa. *Pedicellus* $\frac{1}{4}$ unc. longus. *Flores* iis *Saginæ* subsimiles, interdum apetali? *Petala* coriacea. *Filamenta* subfiliformia. *Capsula* nunc conica, stylo nullo, stigmate capitato; nunc bifida, stylis brevibus divaricatis, stigmatibus capitatis.

39. SAXIFRAGA PERPUSILLA (*Hf. & T.*). Dense cæspitosa muscoidea, ramis brevibus, foliis densissime imbricatis oblongis apice rotundatis basi lata sessilibus concavis marginibus fimbriato-ciliatis cæterum glaberrimis, pedicellis 1-floris glanduloso-pubescentibus, sepalis late oblongis obtusis ciliolatis petalis lineari-oblongis aureis $\frac{1}{3}$ brevioribus, stylis brevibus divaricatis.

Hab. Himalaya orientali alpina, Sikkim, alt. 16,000–17,000 ped.! *J. D. H.* (fl. Sept.) (v. v.)

Cæspites S. *hemisphæricæ* subsimiles, sed folia breviora margine et sepalorum margine non scariosa, floribus sublonge pedicellatis multoties majoribus, S. *Stella-aurea* referentibus. Apices ramulorum hemisphærici, $\frac{1}{8}$ unc. lati. *Pedicelli* $\frac{1}{5}$–$\frac{1}{3}$ unc. longi. *Flores* $\frac{1}{6}$ unc. lati. *Capsula* sepalis duplo longior.

Gen. II. CHRYSOSPLENIUM, *L.*

§ 1. Folia opposita.

1. CHRYSOSPLENIUM NEPALENSE (*Don, Prodr. Flor. Nep.* 210). Glaberrimum, caule ascendente ramoso, foliis oppositis ovato- v. reniformi-cuneatis interdum subcordatis obtusis crenatis, floribus subses-

silibus, seminibus parvis glaberrimis.—D.C. Prodr. iv. 48. (An *C. oppositifolium*, var.?)

Hab. Himalaya centrali et orientali temperata. Nepal! *Wallich*; Sikkim, alt. 7000–10,000 ped., *J. D. H.* (fl. Mai., Jun.) (v. v.)

Distr. America boreali occidentali et Kamtchatka.

C. oppositifolio simillima, sed folia manifeste et regulariter crenata, lobulis latiusculis. *Semina* nitida (opaca fid. D.C.).

2. CHRYSOSPLENIUM TRICHOSPERMUM (*Edgeworth, MSS.*). Glaberrimum, caule ascendente ramoso, foliis oppositis ovato-oblongis obtusis basi cuneatis subserratis, floribus pedicellatis majusculis, seminibus magnis nitidis pilosis.

Hab. Himalaya occidentali temperata. Kumaon, alt. 7000–8000 ped.! *Edgeworth, Madden, Strachey & Winterbottom.*

C. Nepalensi major, robustior, foliis magis oblongis, floribus pedicellatis majoribus, seminibus magnis laxe patentim pilosis.

§ 2. Folia alterna.

3. CHRYSOSPLENIUM ALTERNIFOLIUM (*Linn. Sp. Pl.* 569). Suberectum, glaberrimum, caule longe nudo, foliis radicalibus longe petiolatis reniformi-rotundatis crenato-lobulatis lobulis latis retusis, superioribus breve petiolatis cordato-rotundatis, floribus sessilibus, seminibus nitidis glabris.—*Engl. Bot.* t. 54.

Hab. Himalaya orientali alpina, Sikkim, alt. 12,000–15,000 ped.! *J.D.H.* (fl. August.) (v. v.)

Distr. Cum planta Europæa omnino quadrat.

4. CHRYSOSPLENIUM TENELLUM (*Hf. & T.*). Glaberrimum, caulibus filiformibus procumbentibus intertextis, foliis alternis (parvis) late reniformi-rotundatis profunde cordatis late crenato-lobulatis, floribus sparsis breve pedicellatis, seminibus glaberrimis politis nitidissimis.

Hab. Himalaya occidentali temperata. Kumaon, *Royle*, alt. 10,000 ped.! *Strachey & Winterbottom.*

Species pusilla, *Hydrocotylem* referens. *Caules* sicco filiformes. *Folia* $\frac{1}{4}$–$\frac{1}{3}$ unc. diametr., longe petiolata.

5. CHRYSOSPLENIUM CARNOSUM (*Hf. & T.*). Glaberrimum, cæspitosum, radicibus crasse fibrosis, caulibus erectis crassis ramosis basi foliis squamæformibus laxe vaginatis, foliis alternis breve late petiolatis cuneato-ovatis obtusis crenato-dentatis, floribus sessilibus.

Hab. Himalaya orientali alpina, Sikkim, alt. 14,000–15,000 ped.! *J. D. H.* (v. v.) (fl. August.)

Luride virens, caulibus 2–3-pollicaribus, radicibus 3–5-pollicaribus descendentibus fibrosis. *Folia* radicalia 0, caulina carnosa, $\frac{1}{3}$–$\frac{1}{2}$ unc. longa, infra medium late cuneata integerrima. *Flores* luridi, calycis lobis purpureis. *Semina* immatura.

6. CHRYSOSPLENIUM LANUGINOSUM (*Hf. & T.*). Caulibus carnosis suberectis ramosis petiolisque laxe lanuginosis, foliis alternis inferioribus ovatis ovato-cordatisve obtusis obscure crenatis utrinque laxe pilosis superioribus longe petiolatis reniformibus supremis glabratis, floribus breve pedicellatis.

Hab. Himalaya orientali temperata. Bhotan! *Griffith* (No. 2049).

7. CHRYSOSPLENIUM GRIFFITHII (*Hf. & T.*). Glaberrimum, caulibus longe nudis simplicibus superne divisis, foliis alternis longe petiolatis late reniformi-cordatis profunde lobulatis, lobulis oblongis obtusis, floribus parvis breve pedicellatis.

Hab. Himalaya orientali temperata. Bhotan! *Griffith* (No. 2051).

Species elegans, 3–4-uncialis, caule gracili longe nudo, ima basi squamoso. *Folia* $\frac{1}{3}$ unc. lata, margine in lobulos apiculatos 6–12 obtusos incisa, sinubus acutis. *Flores* parvi, virides.

Gen. III. TIARELLA, *L.*

1. *Tiarella polyphylla* (Don, Prodr. 210), D.C. Prodr. iv. 51.

Hab. Himalaya centrali et orientali temperata. Nepal! *Wallich*; Sikkim, alt. 7000–10,000 ped.! *J. D. H.*; Bhotan! *Griffith.* (fl. Jun.) (v. v.)

Gen. IV. VAHLIA, *Th.*

1. *Vahlia oldenlandioides,* Roxb. Hort. Bengal. 86; Flor. Ind. ii. 89; Wight & Arn. Prodr. 364; Wight, Ill. ii. t. 115. *V. silenoides,* A. DeCand. in D.C. Prodr. iv. 54. *V. Oldenlandiæ,* D.C.*l. c.*

Hab. In Peninsula Indiæ tropicæ; Carnatic! Orissa! *Roxburgh,* &c.

Distr. Africa tropica boreali; Senegalia! et Nubia!

2. *Vahlia viscosa,* Roxb. Hort. Beng. 86; Flor. Ind. ii. 89; Wight & Arn. Prodr. 364. *V. Weldenii,* Reichb. Hort. Bot. 91; D.C. Prodr. iv. 53. *V. sessiliflora,* D.C. Prodr. iv. 54.

Hab. In Peninsula Indiæ tropicæ; Maisor! et Carnatic! *Roxburgh,* &c.; Bundelkhund! *Edgeworth*; planitie Gangetica superiore et Punjab! *Thomson,* &c.; Scinde! *Vicary.*

Distr. Africa tropica boreali; Senegalia! Nubia! Ægypto!

Gen. V. ASTILBE, *Ham.*

1. *Astilbe rivularis,* Hamilt. ex Don, Prodr. Fl. Nep. 210; D.C. Prodr. iv. 51. *Spiræa barbata,* Cambess. in Plant. Jacq. *S. triternata,* Wall. Cat. 706.

Hab. In Himalaya temperata, alt. 5000–9000 ped., frequens a Sikkim! ad Simla! *Hamilton,* &c. Montibus Khasia, alt. 5000–7000 ped.! *Griffith,* &c. (fl. Jun.) (v. v.)

Distr. Java!

2. *Astilbe rubra,* Hf. & T. Bot. Mag. 4959.

Hab. Montibus Khasiæ regione temperata, alt. 5000–6000 ped.! *Griffith,* &c. (fl. August.) (v. v.)

Gen. VI. NEILLIA, *Don* (cf. Adenilema, *Blume*).

1. *Neillia thyrsiflora*, Don, Prodr. 228; D.C. Prodr. ii. 547; Wall. Cat. 698. *N. virgata*, Wall. Cat. 7108.

Hab. In Himalaya centrali et orientali temperata. Nepal! *Wallich*; Sikkim, alt. 5000-8000 ped.! *J. D. H.*; Montibus Khasia, alt. 5000–7000 ped.! *Wallich*, &c. (fl. Jun.) (v. v.)

2. *Neillia rubiflora*, Don, *l. c.*; D.C. *l. c.*

Hab. Himalaya centrali et orientali temperata. Nepal! *Wallich*; Sikkim, alt. 8000–10,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Gen. VII. HYDRANGEA, *L.*

1. *Hydrangea altissima*, Wall. Tent. Flor. Nep. t. 50; D.C. Prodr. iv. 14.

Hab. In Himalaya temperata, alt. 6000–10,000 ped.; frequens a Bhotan! *Griffith*, ad Simla! *T. Thomson.* (fl. Mai.) (v. v.)

2. *Hydrangea vestita*, Wall. Tent. Flor. Nep. t. 49, excl. var. β; D.C. Prodr. iv. 14. *H. heteromalla*, Don, Prodr. Fl. Nep. 211.

Hab. In Himalaya temperata, alt. 6000–10,000 ped., frequens a Bhotan! *Griffith*, ad Kumaon! *Strachey & Winterbottom*, &c. (fl. Jul.) (v. v.)

Folia late v. anguste ovata v. ovato-lanceolata, subtus dense pubescenti-tomentosa, supra glabra v. puberula. *Rami* glabri v. tomentosi; ramulis tomentosis. *Sepala* in fl. imperfectis 4, rotundata v. ovata, integerrima. *Styli* in conum crassum ad medium coaliti, dein erecti, liberi, validi.

3. HYDRANGEA KHASIANA (*Hf. & T.*). Foliis late ovato-cordatis argute denticulatis subtus dense cano-tomentosis, ramulis robustis corymbisque amplis ramosis densifloris subscaberulo-tomentosis, sepalis fl. imperfect. 4 late elliptico-oblongis obtusis integerrimis, stylis in conum latum connatis supra medium liberis erectis robustis.—An forma *H. vestitæ*?

Hab. Montibus Khasia, regione temperata rara ad Surureem et Kala-Panee, alt. 5000–6000 ped.! (fl. Jun.) (v. v.)

Ab *H. vestita* differt habitu robustiore, foliis multo latioribus, basi cordatis.

4. *Hydrangea aspera*, Don, Prodr. 211. *H. vestita*, var. *fimbriata*, Wall.? Tent. Flor. Nep. t. 49.

Hab. In Himalaya temperata, alt. 6000–7000 ped. Nepal! *Wallich*; Kumaon! *Strachey & Winterbottom*; Sikkim! *J. D. H.* (fl. Jun.) (v. v.)

*Rami ramuli*que appresse puberuli v. tomentosi. *Folia* lanceolata, argute serrata, subtus cano-tomentosa. *Corymbi* laxiflori; floribus exterioribus longe pedicellatis. *Sepala* floribus imperfectis 4–5, obovato-oblonga, apiculata, integerrima v. serrata. *Capsulæ* globosæ, stylis liberis, recurvis.

5. HYDRANGEA STYLOSA (*Hf. & T.*). Ramis gracilibus glabratis, ramulis corymbisque puberulis, foliis ellipticis sinuato-dentatis utrinque

glabratis nervis subtus puberulis, corymbo paucifloro, fl. imperfectis sepalis 4–5 late cuneato-oblongis grosse sinuato-crenatis, stylis liberis capsulæ æquilongis rectis subulatis.

Hab. In Himalaya orientali temperata. Sikkim, alt. 8000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Exemplaria manca. *Folia* 2-pollicaria, petiolata, submembranacea.

6. HYDRANGEA ROBUSTA (*Hf. & T.*). Ramulis robustis corymbis petiolisque pubescentibus, foliis longe petiolatis (petiolo superioribus alato) late ovatis ovato-cordatisve margine fimbriato-dentatis, superne asperulis subtus pubescenti-tomentosis, corymbis laxis multifloris, sepalis fl. imperfectis 4–5 late ovatis grosse serrato-dentatis, stylis liberis recurvis.

Hab. In Himalaya orientali temperata. Sikkim, alt. 5000–7000 ped.! *J. D. H.* (fl. August.) (v. v.)

Arbor parva, ramis robustis. *Folia* 3–4 unc. longa, petiolo 2–3-unciali, basi interdum valde inæqualia, pagina superiore pilis rigidis asperula, costa venisque primariis pubescentibus, suprema sæpius petiolo breviore alato, ala fimbriato-dentata. *Sepala* fl. imperfect. alba, magna, $\frac{3}{4}$–1 unc. longa, interdum lobata, corymbis luxuriantibus minora, subserrata v. imo integerrima.

Gen. VIII. ADAMIA, *Wall.*

Cyanites, *Reinwardt*. Dichroa, *Lour.*?

1. *Adamia cyanea*, Wall. Tent. Flor. Nep. 46. t. 36; Plant. As. Rar. t. 213. *Hydrangea anomala*, Don, Prodr. 211.—Cf. *Cyanites sylvatica*, Reinwardt, in Blume, Bijd. 921, et cf. *C. chinensis*, Gardn. (*versicolor*, Fortune), quæ differt floribus majoribus.

Hab. In Himalaya centrali et orientali temperata. Nepal! *Wallich.* Sikkim, alt. 6000–8000 ped.! *J. D. H.* Bhotan! *Griffith.* Mont. Khasia, alt. 4000–5000 ped., *J. D. H. & T. T.* (fl. Jun.) (v. v.)

Distr. Java? China?

Gen. IX. PILEOSTEGIA, *Hf. & T.*

1. *Pileostegia viburnoides*, Hf. & T. (Tab. II.)

Hab. Montibus Khasia, regione subtropica, *Lobb.* Prope Nunklow, alt. 3000–5000 ped.! *J. D. H. & T. T.* (fl. Jul.) (v. v.)

Frutex glaberrimus. *Rami* teretes. *Folia* opposita, petiolata, ovato-lanceolata, glaberrima, obscure versus apices sinuato-serrata, coriacea, penninervia, supra nitida. *Panicula* terminalis, ramosa, ramis suboppositis subcorymbosis ramulisque puberulis. *Floribus* sub $\frac{1}{3}$ unc. diametr. *Stamina* elongata. *Stylus* brevis. (Tab. II.)

Fig. 1, Flos; 2, id. corolla delapsa; 3, corolla; 4, stamen; 5, ovarium, calyx et stylus; 6, ovarium verticaliter sectum; 7, id. transverse sectum; 8, semen immaturum—*omnes sub lente aucti.*

Gen. X. POLYOSMA, *Bl.*

1. POLYOSMA WALLICHII (*Bennett, Plant. Jav. Rar.* 196). Ramulis petiolis racemisque pubescentibus, foliis oblongo-lanceolatis integerrimis serratisve subtus pubescentibus, floribus pedicellatis.—*Wall. Cat.* 8471.

Glossoma acuminatum, Wall. Cat.—An var. *P. integrifoliæ* Blume?

Hab. In Montibus Khasia regione tropica, alt. 2000–4000 ped.! *De Silva, J. D. H. & T. T.* (fl. Jun.) (v. v.)

Distr. Java?

2. POLYOSMA FRAGRANS (*Bennett in Plant. Jav. Rar.* 196). Foliis obovato-lanceolatis acuminatis, floribus sessilibus.—*Itea fragrans*, Wall. Cat. 8472 in parte, et in Roxb. Flor. Ind. ii. 420.

Hab. Peninsula Malayana ad Singapore! *Wallich*; Malacca! *Griffith.*

3. POLYOSMA INTEGRIFOLIA (*Blume, Bijd.* p. 659). Foliis lanceolatis acuminatis integerrimis subtus glabris, floribus pedicellatis.—*Bennett, Plant. Jav. Rar.* 196. *P. fragrans*, Wall. Cat. 8472 in parte.

Hab. Peninsula Malayana; ad Malacca! *Griffith.* Singapore! *Wallich.*

Distr. Java.

NIMMOIA, Wight = *Ameletia floribunda.*

Gen. XI. ITEA.

1. ITEA NUTANS (*Royle, Ill.* p. 226). Foliis ovato- v. elliptico-oblongis acuminatis argute serratis, racemis terminalibus folio longioribus.

Hab. In Himalaya occidentali temperata. Kumaon, alt. 3000–6000 ped.! *Royle*, &c. (fl. Jul.) (v. v.)

2. ITEA MACROPHYLLA (*Wall. Cat.* 7200). Foliis (3–5-pollicaribus) ovato- v. obovato-lanceolatis acuminatis serratis, racemis folio brevioribus longioribusve.—*Kurrimia*? Wall. Cat. 7200.

Hab. In Montibus Khasia regione tropica, alt. 2000–4000 ped.! *Wallich*, &c., et in Himalaya orientali tropica. Bhotan! *Griffith.* (fl. Jun.) (v. v.)

3. ITEA CHINENSIS (*Hook. & Arn. Bot. Beech.* 189. t. 39). Foliis (2-pollicaribus) obovatis obovato-lanceolatisve acuminatis serratis, racemis lateralibus foliis subæquilongis.—An forma *I. macrophyllæ*?

Hab. In Montibus Khasia regione temperata, alt. 4000–6000 ped.! *J. D. H. & T. T.* (fl. Mai.) (v. v.)

Distr. China.

Nat. Ord. PARNASSIEÆ.

Gen. I. PARNASSIA, *L.*

This genus abounds in the temperate and alpine regions of the mountains of India, attaining 17,000 feet of elevation. We consider it to be undoubtedly more nearly allied to *Saxifrageæ*

than to any other Order except *Droseraceæ*. In one curious physiological point it agrees with *Saxifraga* itself, viz. the stamens approaching the stigma by pairs, shedding their pollen and retiring, an economy common to all the species we have examined in a living state; it also agrees so remarkably with that genus in habit, that it is difficult to distinguish some of the small alpine species in their native places of growth at first sight; the petals in both are persistent, of a singularly thick and coriaceous or fleshy texture with transparent veins. Another point of resemblance with *Saxifrageæ* is the variable amount of adhesion of the calyx-tube and ovary: in all the species the ovary is almost free in a very young state, and it is more during the after-development of the fruit than of the ovary that the former becomes imbedded in the tube of the calyx. The stigmas are always free, and the very short styles also in the species with dehiscent capsules: in the half-superior fruited species with dehiscent capsules, the dehiscence takes place only above the calyx-tube, and the fruit of *P. nubicola* strongly resembles that of a *Wahlenbergia* in general appearance, though not in internal structure.

There are three principal modifications of the fruit in *Parnassia*: a superior ovoid 3–4-valved capsule, which is the structure in *P. palustris*, *P. foliata*, and several American species;—a superior trigonous coriaceous indehiscent capsule, in which the placentæ are sometimes confined to the lower part of the cell, and which has a longer style than either of the other forms of capsule; this characterizes the 'Peninsular' Khasia, and a few of the Himalayan species;—and a semi-superior fruit, as in the *P. nubicola*, *P. affinis*, *P. pusilla*, and *P. ovata*; species that may possibly prove forms of one.

The structure of the seeds and ovules of all is very similar, and has been well described: in being exalbuminous they differ from those of any of the other groups of *Saxifrageæ*, as well as from *Droseraceæ*, amongst which they are most frequently placed in systematic works.

The placentation in all the species is decidedly parietal, as in *Droseraceæ*; nor have I, in the earliest-examined stages, detected any evidence of this being a deviation from the axile type: this has been held as an argument against allying *Parnassia* with *Hypericineæ*, but which the truly parietal placentation of *Elodea* invalidates; the loculicidal dehiscence of *Parnassia*, on the other hand, is against its Hypericineous alliance, as are its truly perigynous stamens and petals.

The remarkable staminodia of *Parnassia* demand some notice: these we regard as a whorl of stamina opposite the petals: in *P. tenella*, they appear under a very unusual form, much more nearly resembling stamina than those of the other species, being columnar, and terminated by a broad horizontal glandular disk; these, if not absolutely inserted in the same whorl with the stamens, are so nearly so, that in the fully-formed flower the bases of the filaments touch the bases of the staminodia on either side of them. The much-divided staminodia of *P. palustris*, and which have in part suggested the alliance of the genus with *Hypericineæ*, are much less usual than the simply lobed or trifid; and the staminodia are in some species almost entire, and so small as to escape notice; their nearest homologue in structure and position is perhaps to be found in the hypogynous scales of the allied Order *Crassulaceæ*.

The only other anomalies we have to indicate amongst the Indian kinds are, the foliaceous scape of *P. foliata*, a species otherwise nearly related to *P. palustris*, and which assumes a very different habit from any of its congeners, resembling *Saxifraga diversifolia*; and the decidedly creeping rhizome of *P. tenella*, whose fimbriated stipules, green flat flowers, reflexed petals, and curious staminodia, render it decidedly the most abnormal species of the genus hitherto discovered. It is somewhat singular, that though it deviates so remarkably from the typical forms, it does not throw any light upon the affinities of the genus.

PARNASSIA.

§ I. *Capsula* supera, ovoidea. *Staminodia* profunde divisa, segmentis filiformibus glanduloso-capitatis. *Placentæ* lineares secus totam longitudinem ovarii productæ.

1. PARNASSIA FOLIOSA (*Hf. & T.*). Caule acute quadrangulo angulis alatis folioso, foliis caulinis rotundato-cordatis sessilibus lobis amplexicaulibus, petalis profunde fimbriatis, stigmatibus subsessilibus.

Hab. Mont. Khasia regione temperata prope Moflong et Nonkreem, alt. 6000–7000 ped.! rarissima. (fl. Sept.) (v. v.)

Herba pro genere robusta, glaberrima, spithamæa, structura floris *P. palustri* accedens. *Folia* radicalia non visa, caulina 6–8, alterna, coriacea, 1 unc. diametr., 5–7 nervia et costata. *Flores* $\frac{1}{3}$–$1\frac{1}{4}$ unc. diametr., albi.

2. *Parnassia palustris*, L. (Exempl. fructif.)

Hab. Tibetia occidentali regione temperata ad Iskardo, alt. 7000 ped.! *T. Thomson.* (v. v.)

Distr. Europa, Asia et America boreali subalpina et subarctica.

§ II. *Capsula* supera, triquetra, late obcordata. *Staminodia* 5–7-fida.

3. PARNASSIA WIGHTIANA (*Wall. Cat.* 116). Foliis reniformibus, reniformi-rotundatisve, petalis plus minusve infra medium fimbriatis.—*Wight & Arn. Prodr.* 35; *Wight, Ill.* t. 21. B; *Ic.* t. 945; *Arnott in Hook. Comp. Bot. Mag.* ii. 315. *P. ornata,* Wall. Cat. 1247; Arn. *l. c.* *P. Schmidii,* Zenker, Plant. Ind. dec. 1. p. 3. t. 5.

Hab. Himalaya occidentali temperata. Kumaon! *Blinkworth.* Mont. Khasia, regione temperata, alt. 5000–6000 ped. frequens! *J. D. H. & T. T.* Mont. Nilgherrie, alt. 7000–8000 ped.! *Wight,* &c. (fl. Aug.) (v. v.)

Variat insigniter statura, foliis apice rotundatis acutisve; petalorum marginibus plus minusve fimbriatis apicibusque erosis integerrimisve; staminodiis 5–7-fidis, segmentis latis angustisve. *Placentæ* basin versus capsulæ.

§ III. *Capsula* supera, triquetra, late obcordata. *Staminodia* 3-loba v. trifida.

4. PARNASSIA MYSORENSIS (*Heyne in Wall. Cat.* 3754). Foliis radicalibus reniformibus v. rotundato-cordato-reniformibus sinu lato acutis rotundatisve, scapis (sæpissime numerosis) gracilibus, petalis obovato-spathulatis marginibus dentatis (rarius integerrimis), staminodiis elongato-cuneatis apice dilatatis trifidis, capsula subglobosa $\frac{3}{4}$ supera, stylo attenuato brevi, stigmatibus 3–5.—*Wight & Arn. Prodr.* 35; *Arn. in Comp. Bot. Mag.* ii. 315.

β. Filicaulis, scapis filiformibus, foliis ovato-cordatis, petalis angustioribus.

Hab. Mont. Khasia regione temperata, alt. 5000–7000 ped. frequens! *Lobb,* &c. et Montibus Peninsulæ! *Heyne,* &c. (fl. Sept.) (v. v.)

Var. *β.* In sylvis temperatis Himalayæ orientalis prov. Sikkim, alt. 7000–9000 ped.! *J. D. H.* (fl. Aug.) (v. v.)

Herba 4–6-uncialis, plerumque multiflora. *Folia* sub $\frac{1}{2}$ unc. lata. *Scapi* graciles v. subrobusti. *Flores* $\frac{3}{4}$ unc. lati. *Petala* rarius integerrima.

§ IV. *Capsula* supera, triquetra, obcordata. *Placentæ* versus basin loculi. *Staminodia* simplicia, columnæformia, apice discifera.

5. PARNASSIA TENELLA (*Hf. & T.*). Rhizomate prostrato repente, stipulis fimbriatis, foliis reniformibus profunde bilobis marginibus erosis, petalis spathulatis reflexis viridibus.

Hab. In sylvis temperatis Himalayæ orientalis ad Sikkim, alt. 9000–11,000 ped. inter muscos ad truncos arborum, &c. (fl. August.) (v. v.)

Species singularis, habitu ab omnibus diversa, sed indole florum simillima. *Rhizoma* gracile, $\frac{1}{2}$–2 unc. longum, fibras plurimas emittens, apice folia pauca gerens. *Petioli* graciles, 1–1$\frac{1}{2}$-pollicares, basi stipulis adnatis vaginantibus laceris membranaceis aucti. *Folia* late reniformia, ¾–1 unc. lata, glaberrima, læte viridia, margine tenuiter cartilagineo minute fisso et eroso. *Scapus* foliis duplo longior, tenuis, carnosulus, angulatus, infra florem 5-alatus, alis secus angulos calycis tubi productis. *Flores* virides, inclinati, plani, ¼ unc. diametr. *Calycis* lobi breviter oblongi, obtusi. *Petala* paulo obliqua, margine interdum erosa, v. dentata, supra medium arcte reflexa apice rotundata. *Stamina* 5, filamenta subulata, basi dilatata. *Staminodia* ½ longit. staminum, erecta, crassa, teretia, apice discum scutiformem glandulosum viridem gerentia, stipitibus ima basi paulo dilatatis et una cum staminibus seriem unicum formantibus. *Ovarium* globosum, superum, disco plano insidens, stylo brevi; stigmata 3 divergentia apice truncata. *Capsula* immatura late obcordata stylo conspicuo, triquetra v. trialata, coriacea, indehiscens? *Semina* lineari-oblonga, testa brunnea coriacea, embryone generis.

§ V. *Capsula* semi-supera. *Staminodia* 3-loba v. trifida.

6. PARNASSIA NUBICOLA (*Wall. Cat.* 1246). Foliis radicalibus ovatis ovato-oblongis cordato-oblongisve, caulino oblongo petiolo brevissimo amplexicauli, petalis anguste spathulatis marginibus erosis v. infra medium fimbriatis, staminodiis superne late dilatatis trifidis, ovarii parte superiore conica, stigmatibus 3 sessilibus.—*Arn. in Comp. Bot. Mag.* ii. 315; *Wight, Ill.* t. 21. C.

Hab. In Himalayæ regione temperata, alt. 6000–12,000 ped., a Sikkim! *J. D. H.*, ad Kashmir! *T. Thomson,* frequens. (fl. Aug.) (v. v.)

Herba 4 unc. ad 1½ pedalem. *Capsula* inclinata semisupera; pars inferior ½-pollicaris obconica, superior hemisphærica coriacea trivalvis valvis apice stylo brevi persistente terminatis, seminibus testa laxa.

7. PARNASSIA AFFINIS (*Hf. & T.*). Foliis radicalibus ovato-oblongis oblongo-cordatisve obtusis, scapo nudo v. basin versus 1-foliato, petalis obovato-spathulatis marginibus eroso-dentatis, staminodiis cuneato-quadratis obtuse trilobis v. trifidis, capsula semisupera stylo attenuato.

Hab. In Himalayæ orientalis regione temperata et alpina provinciæ Sikkim, alt. 11,000–14,000 ped. (fl. Jul.) (v. v.)

Inter *P. nubicolam* et *P. pusillam* media; a priore differt statura humiliore omnibus partibus minore, staminodiis brevioribus styloque longiore; a *P. pusilla* differt statura triplo majore, staminodiis longioribus quam latis. A *P. oblonga* differt staminodiis, a *P. Mysorensi* forma foliorum et capsulæ.

8. PARNASSIA PUSILLA (*Wall. Cat.* 1245). 1–3-pollicaris, foliis radicalibus reniformibus subtus discoloribus, caulino ovato-cordato amplexicauli, petalis late oblongis v. obovato-spathulatis marginibus infra medium parce fimbriatis, staminodiis latioribus quam longis obtuse 3-lobis.—*Arn. in Comp. Bot. Mag.* ii. 315.

Hab. Regione alpina Himalayæ, alt. 10,000–15,000 ped., a Sikkim! *J. D. H.*, ad Kunawur! *Thomson.* (fl. Aug.) (v. v.)

Formæ perpusillæ *P. nubicolæ* simillima, sed forma petalorum et staminodiorum diversa. *Folia* 2–4 lin. lata. *Flores* $\frac{1}{4}$–$\frac{1}{2}$ unc. lati. *Capsula* ut in *P. nubicola*, sed brevior. *Petala* interdum emarginata.

9. Parnassia ovata (*Ledeb. in Mem. Acad. Petersb.* v. p. 528). Foliis radicalibus ovalibus ovali-cordatisve obtusis, scapo gracili, petalis obovato- v. lineari-spathulatis integerrimis, staminodiis elongato-cuneatis trifidis segmentis subulatis erectis.—*P. subacaulis*, Kar. & Kiril.

Hab. In Himalaya occidentali et Tibetia occidentali temperata et alpina, alt. 8000–15,000 ped. Affghanistan! *Griffith.* Kashmir! *Jacquemont.* Kishtwar! Parang! Balti! Gugi! &c. frequens, *T. Thomson.* (fl. Sept.) (v. v.)

Distr. In Siberia trans-baikalensi et Soongaria.

Herba statura variabilis, 1–10-pollicaris. *Folia* parva, $\frac{1}{2}$–$1\frac{1}{2}$ poll. longa. *Scapi* plerumque graciles, sæpe aphylli. *Flores* $\frac{1}{4}$–$\frac{1}{2}$ unc. diametr. *Capsula* ut in *P. nubicola*, &c. sed multoties minor.

Nat. Ord. DROSERACEÆ.

Gen. I. Drosera, *L.*

(Diagnoses ex Planchon in Ann. Sc. Nat. sér. iii. vol. ix.)

1. Drosera Burmanni (*Vahl, Symb.* iii. 50). Foliis omnibus radicalibus cuneato-spathulatis, stipulis scariosis, scapis 1–3, pedicellis glaberrimis, calyce 5-partito, stylis 5 indivisis, stigmatibus papilloso-fimbriatis, placentis 5.—*Planch. l. c.* p. 190; *Wight, Ill.* t. 20. A. (excl. fig. stigmatis).

Hab. In Ceylonia! *Macrae*, et Montibus Peninsulæ Nilghiri, *G. Thomson*! Canara! *Plant. Hohenack.* Bengalia! *Wallich.* Himalaya orientali tropica ad Sikkim, alt. 1000 ped! *J. D. H.* Silhet! et Chittagong! *J. D. H. & T. Thomson.* (fl. Nov.) (v. v.)

Distr. Africa occidentali; China; Ins. Philippinis; Borneo; Nov. Zealandia.

2. Drosera Indica (*Linn. Fl. Zeyl.* p. 51). Caule simpliciusculo decumbente, foliis sparsis linearibus acuminatis, racemis oppositifoliis 3-paucifloris, calycis laciniis anguste lanceolatis, stylis 3 bipartitis, placentis 3.—*Planch. l. c.*; *Wight. Ill.* i. t. 20. f. C. (excl. fig. stigmatis). Cf. *D. Finlaysoniana*, Wall. Cat. *D. Indicæ* var.? fide *Planchon.*

Hab. In Ceylonia, *Macrae*, &c. Maisor! et Canara! *Wight*, &c. Tenasserim ad Tavoy! *Gomez.* Pegu! *M'Lelland.*

Distr. Africa occidentali! Ins. Philippinis! Australia!

3. Drosera lunata (*Ham. ex D.C. Prodr.* i. 319). Glaberrima, foliis radicalibus fugacissimis, caulinis lunatis longe petiolatis, calycis

lobis subrhombeo-ovatis glaberrimis apice fimbriatis, stylis 3 fimbriato-laceris, capsula 3-valvi.—*Planch. l. c.* 296. *D. peltata*, Wight & Arn. Prodr. i. 34 (non Smith); Wight, Ill. t. 20. D.

Hab. In regionibus subtropicis temperatisque totius Indiæ. In Himalaya tota, alt. 5000–10,000 ped., a Kunawur! *T. Thomson*, ad Sikkim! *J. D. H.* Montibus Peninsulæ a Concan! *Stocks*, ad Nilghiri, *Wight*, &c. In Ceylonia! *Gardner*, &c., necnon Monte Kola in Peninsula Malayana prope Malacca, *Lobb*. (fl. Mai.–Octobr.) (v. v.)

Distr. China! Java!

Gen. II. Aldrovanda, *Monti*.

1. *Aldrovanda vesiculosa*, Linn. Sp. Pl. 412; Planch. *l. c.* *A. verticillata*, Roxb. Fl. Ind. ii. 113.

Hab. Bengalia inferiore; prope Calcutta! *Roxburgh*; paludibus "Salt-pans" dictis, *T. Thomson*. (fl. ?) (v. v.)

Distr. Gallia australi! Pedemontana! Rossia media, et Lithuania. Exemplaria Bengalensia cum Gallicis omnino conveniunt.

Nat. Ord. PHILADELPHEÆ.

Gen. I. Philadelphus, *L.*

1. ***Philadelphus coronarius***, L.

Var. *β. tomentosa*. *P. tomentosus*, Wall. Cat. 3653; Royle, Ill. 216. t. 46. f. 1.

Hab. In Himalaya occidentali temperata, alt. 7000–8000 ped. Garwhal! *Strachey & Winterbottom*. Simla! *Madden*, &c. Kishtwar! *T. Thomson*.

Var. *β*. In Himalaya temperata tota, a Sikkim, alt. 7000–9000 ped.! *J. D. H.*, ad Jamu, alt. 5000–6000 ped.! *T. Thomson*. (fl. Mai., Jun.) (v. v.)

Distr. Europa centrali? Japan!

Gen. II. Deutzia.

1. Deutzia corymbosa (*Brown in Wall. Cat.* 3652). Foliis ovatis acuminatis lanceolatisve serratis, ramulis corymbisque stellato-puberulis, floribus paniculatim corymbosis, calycis segmentis triangulari-ovatis, petalis late obovatis rotundatisve glabris.—*Royle, Ill.* t. 46. f. 2; *Bot. Reg.* N. S. xxv. *Miscell.* p. 37. xxvi. t. 5.

Hab. In Himalaya temperata tota, a Bhotan! *Griffith*, et Sikkim, alt. 7000–12,000 ped.! *J. D. H.*; ad Kishtwar, alt. 6000–10,000 ped.! *T. Thomson*. (fl. Mai.–Jul.) (v. v.)

2. Deutzia staminea (*Br. in Wall. Cat.* 3651, *et in Wall. Plant. As. Rar.* ii. 82. t. 191). Foliis ovato-lanceolatis ovatisve acuminatis serratis supra ramulis paniculisque scaberulis subtus calycibusque cine-

rascentibus, floribus ramulis lateralibus paniculatis, calycis segmentis ovatis apice subulatis, petalis lineari-obovatis oblongisve pubescentibus.—*Lindl. Bot. Reg.* xxxiii. t. 13. Cf. *D. scabra,* Thunb.

Var. *β. Brunoniana,* Wall., floribus majoribus.

Hab. In Himalaya temperata tota. Sikkim, alt. 7000–10,000 ped.! *J. D. H.* Nipal! *Wallich.* Kumaon! 5000–8000 ped., *Blinkworth,* &c. Simla! *Comitissa Dalhousie,* &c. Kashmir! *T. Thomson.* Marri! *Fleming.* (fl. Mai.) (v. v.)

Distr. ? Japan.

3. DEUTZIA MACRANTHA (*Hf. & T.*). Foliis ovatis longe acuminatis irregulariter sinuato-denticulatis ramulisque stellatim puberulis, panicula terminali trichotoma pauciflora, calycis lobis subulatis, petalis elliptico-lanceolatis glabris.

Hab. In Himalaya occidentali temperata. Kumaon, alt. 5500 ped.! *Strachey & Winterbottom.*

Habitus *Philadelphi.* *Folia* 2½–3 unc. longa. *Flores* fere 1 unc. diametro.

Nat. Ord. HAMAMELIDEÆ.

(Conspectus Generum Floræ Indiæ Orientalis.)

1. CORYLOPSIS, *Sieb. & Zucc.* *Calycis* limbus semi-superus, valvatus. *Petala* 5, subvalvata, elongata. *Stamina* 5, squamulis alternantia. *Ovarium* 2-loculare; ovulis solitariis. *Capsula* lignea, endocarpio corneo soluto. *Semina* testa crustacea nitida.—Frutices; foliis *stipulatis, serratis, deciduis*; floribus *præcocibus, amentaceis; amentis nutantibus.*

2. HAMAMELIS, *L.* *Calycis* limbus semi-superus, valvatus. *Petala* 4, æstiv. involuto-valvata, linearia. *Stamina* 4, squamulis 4 alternantibus, filamentis brevibus, antheris valvula dehiscentibus. *Ovarium* 2-loculare; ovulis solitariis. *Capsula* lignosa, endocarpio corneo soluto. *Semina* testa crustacea nitida.—Frutices *pube stellata*; foliis *stipulatis persistentibus*; floribus *capitatis.*

3. PARROTIA, *C. A. Mey.* *Calycis* limbus semi-superus. *Petala* 0. *Stamina* 5–7. *Ovarium* 2-loculare, ovulis solitariis pendulis. *Capsula* coriaceo-lignosa, endocarpio corneo soluto. *Semina* testa crustacea.—Frutices *v.* arbores; foliis *stipulatis, deciduis*; floribus *præcocibus, capitatis*; capitulis *involucratis.*

4. BUCKLANDIA, *Br.* *Flores* polygamo-dioici, in capitula connati. *Calycis* limbus semi-superus, truncatus. *Petala* linearia, æstiv. involuta. *Stamina* 10–14. *Ovarium* 2-loculare, ovulis quovis

loculo 6. *Fructus* multiplex, capsulis semi-exsertis bivalvibus demum liberis. *Semina* quovis loculo 6, infimo solum perfecto; testa coriacea superne in alam producta.—Arbor *elata, glaberrima*; foliis *persistentibus, primum stipulis* 2 *magnis coriaceis deciduis inclusis, vernat. inflexis.*

5. Liquidambar, *L.* *Flores* capitati, connati, unisexuales. *Calycis* tubus basi ovario connatus, limbo lobato. *Petala* 0. *Stamina* plurima, filamentis brevibus. *Ovarium* 2-loculare; ovulis plurimis. *Fructus* multiplex; capsulis semi-exsertis bivalvibus demum liberis. *Semina* quovis loculo plurima, infimo solum perfecto; testa marginata.—Arbores *glabræ*; foliis *alternis deciduis ? stipulatis.*

6. Anisophyllea, *Br.* *Flores* hermaphroditi, spicati. *Calyx* superus, 4-partitus, valvatus. *Petala* 4, laciniata, valvato-involuta. *Stamina* 8. *Ovarium* 4-loculare, ovulis solitariis pendulis. *Fructus* drupaceus, abortu 1-spermus.—Arbores; foliis *coriaceis, glaberrimis, 5-nerviis*; floribus *racemosis.*

Gen. I. Corylopsis, *Sieb. & Zucc.*

1. Corylopsis Himalayana (*Griffith, Plant. Cantor, in Trans. As. Soc. Bengal*). Ramulis petiolis pedunculisque sericeo-tomentosis, foliis obovato-oblongis acutis acuminatisve argute serratis basi cordatis plicatis subtus cano-pubescentibus sericeisve, amentis pendulis, bracteis calycibusque dense sericeis, petalis linearibus albis, calyce fructifero subbaccato, seminibus nitidis.

Hab. In Himalaya orientali et Montibus Khasia regione temperata, alt. 5000–6000 ped., *Griffith*, &c. (fl. Nov.) (v. v.)

Gen. II. Hamamelis, *L.*

1. Hamamelis Chinensis (*Brown in Abel, Voy.* 374. *cum Icone*). Stellatim tomentosa, foliis ovato-oblongis acuminatis supra sparse puberulis, floribus subternis, calycis lobis ovatis obtusis, petalis anguste linearibus, capsulis obovatis dense tomentosis.

Hab. Montibus Khasia regione subtropica prope Nurtiung, alt. 4000–5000 ped., *J. D. H. & T. Thomson.* (fl. Octobr.) (v. v.)

Distr. China!

Gen. III. Parrotia, *C. A. Mey.*

1. Parrotia Jacquemontiana (*Dcne in Plant. Jacq.* 73. t. 83). Foliis orbiculatis obovatisve basi cordatis grosse dentatis supra glabris opacis subtus petiolis pedunculis capsulisque dense stellatim tomentosis, stipulis ovatis oblongisve pubescentibus, involucris ob-

ovato-rotundatis membranaceis albis integerrimis lobatis serratisve.—*Fothergilla involucrata*, Falconer in Linn. Soc. Proceedings, Febr. 1839, et in Royle, Ill. Introd. xxv.

Hab. Himalaya occidentali temperata; Chamba! et Kashmir! alt. 5000–7000 ped., *T. Thomson.* (fl. Mart.) (v. v.)

Gen. IV. BUCKLANDIA, *Br.*

1. *Bucklandia populifolia*, Br. in Wall. Cat. 7414; Griffith in As. Research. xix. 94. t. 13, 14.

Hab. In Himalaya orientali temperata et subtropica, Nepal! et Sikkim! alt. 4000–7000 ped.! *J. D. H.*, et in Montibus Khasia, alt. 4000–6000 ped.! *Griffith*, &c. (fl. Nov.) (v. v.)

Gen. V. LIQUIDAMBAR, *L.*

1. *Liquidambar Altingia*, Blume, Flor. Jav. fasc. xvii. p. 6. t. 1, 2.—*Sedgwickia cerasifolia*, Griffith in As. Research. xix. p. 98. t. 15, 16.

Hab. In Assam! et Montibus Mishmee! *Griffith.*

Distr. Java!

Gen. VI. ANISOPHYLLEA, *Br.*

1. *Anisophyllea Zeylanica*, Benth. in Niger Flora, 575 & 342.—*Tetracrypta cinnamomoides*, Gardn. & Champ. in Hook. Journ. Bot. i. 314. et v. 378.

Hab. Insula Ceylon, regione tropica!, *Gardner*, &c.

Nat. Ord. RIBESIACEÆ.

Gen. I. RIBES, *L.*

a. *Flores* solitarii.

1. *Ribes Grossularia*, Linn. Wall. Cat. 6835, et in Flor. Ind. ii. 514.—*R. Himalensis*, Royle, Ill. 225.—*R. alpestre*, Dcne in Plant. Jacq. 64. t. 75.

Hab. In Himalaya occidentali temperata. Kumaon, alt. 11,500 ped.! *Webb, Strachey & Winterbottom.* Kunawur, alt. 9000–12,000 ped.! *Jacquemont*, &c. Kashmir! *Falconer*, &c. (fl. Mai.)

Distr. Europa boreali et alpina, Græcia! Caucasus!

b. *Flores* racemosi. *Calycis* tubus brevis, ultra ovarium non longe productus.

2. RIBES LEPTOSTACHYUM (*Dcne in Voy. Jacq. Bot.* 65. t. 76; non *Benth. Plant. Hartweg*). Polygamo-dioicum, glanduloso-puberulum et pilosiusculum, foliis parvis ($\frac{1}{2}$–1-pollicaribus) late rotundato-cordatis reniformi-rotundatisve 3-lobis crenato-dentatis, racemis subdensifloris, bracteis linearibus, floribus parvis viridibus, calycis tubo late obconico.

lobis ovato-rotundatis obtusis, baccis parvis glandulosis v. glabratis.—*R. villosum,* Wall. Cat. 6832, et in Flor. Ind. ii. 514; Don, Gen. Syst. Gard. iii. 187.—Cf. *R. orientale,* Poir. et *R. heterotrichum,* C. A. Meyer in Led. Flor. Ross.

Hab. In Himalaya occidentali temperata. Nepal! *Wallich,* et Garwhal, alt. 10,000–11,000 ped.! *Strachey & Winterbottom*; Kashmir, alt. 7000–9000 ped.! *Jacquemont,* &c. In Tibetia occidentali, alt. 8000–14,000 ped. vulgatiss.! *T. Thomson.* Affghanistan! *Griffith.* (fl. Mai., Jun.) (v. v.)

Distr. ? Siberia. ? Persia. ? Soongaria.

Bracteæ pedicellos subæquantes. *Flores* fusci v. luride flavi. *Petala* late obovata, patentia. *Filamenta* brevia, antheris vix longiora. *Stylus* longe bifidus, stigmatibus magnis capitatis.

3. **Ribes laciniatum** (*Hf. & T.*). Polygamo-dioicum, foliis (1–1½ unc. longis) gracile petiolatis triangulari-ovato-cordatis trilobis lobis argute dentatis acuminatis subtus ramulisque glaberrimis supra sparse puberulis, racemis gracilibus laxifloris folio brevioribus sparse glanduloso-puberulis, bracteis linearibus acuminatis, floribus parvis, calycis tubo late obconico lobis lanceolatis acuminatis fusco-purpureis, antheris sessilibus, baccis glaberrimis parvis.

Hab. In Himalaya orientali temperata. Bhotan! *Griffith.* Sikkim, alt. 10,000–12,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

R. glaciali affine, differt præcipue foliis sublaciniatis, lobis angustioribus, calycisque lobis acuminatis. *Bracteæ* pedicellos graciles subæquantes. *Flores* glaberrimi. *Petala* linearia. *Stylus* longe bifidus, stigmatibus capitatis. *Baccæ* rubræ.

4. **Ribes luridum** (*Hf. & T.*). Polygamo-dioicum, foliis ramulisque glaberrimis (1 unc. latis) late cordato-rotundatis trilobis lobis obtusis subduplicato-crenato-dentatis, racemis puberulis erectis folio brevioribus, floribus castaneis breve pedicellatis, bracteis oblongo-spathulatis, calycis tubo ovoideo lobis ovato-oblongis obtusiusculis, baccis glaberrimis.

Hab. In Himalaya orientali temperata. Sikkim, alt. 10,000–12,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

R. glaciali affine, differt foliis minoribus latioribus, lobis obtusis, floribus castaneis, bracteisque latioribus. *Frutex* 4-pedalis. *Rami* cortice nigro tecti. *Racemi* subdensiflori. *Flores* breve pedicellati. *Bracteolæ* pedicellos superantes. *Petala* late obovata, patula. *Antheræ* subsessiles. *Stylus* apice bifidus; stigmatibus capitatis.

5. **Ribes desmocarpum** (*Hf. & T.*). Dioicum, ramulis petiolis racemisque dense glanduloso-pubescentibus, foliis (1½–2 poll. longis) ovato- v. triangulari-cordatis 3-lobis lobis acutis subduplicato-crenatis supra puberulis subtus glanduloso-pubescentibus, racemis multifloris, bracteis linearibus, calycis tubo late campanulato basi conico lobis ovato-oblongis obtusis, baccis glanduloso-pubescentibus.

Hab. In Himalaya orientali temperata. Bhotan! *Griffith.* Sikkim, alt. 10,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Rami cortice fusco glabro, ramulis dense glandulosis. *Racemi* floriferi foliis subæquilongi. *Bracteolæ* pedicellos superantes. *Flores* fusci. *Petala* late obovato-spathulata. *Filamenta* antheris æquilonga. *Stylus* breviter bifidus, stigmatibus capitatis. *Baccæ* breve pedicellatæ subimbricatæ.

6. RIBES GLACIALE (*Wall. Cat.* 6833, *et in Flor. Ind.* ii. 513). Polygamo-dioicum, ramulis foliisque glaberrimis, foliis late triangulari-ovato-cordatis trilobis lobis acutis acuminatisve crenato-serratis, racemis floriferis erectis sparse puberulis, bracteis linearibus, floribus parvis, calycis tubo late obconico lobis oblongis acutiusculis patentibus, baccis parvis glaberrimis pubescentibusve.—*R. acuminatum,* Wall. Cat. 6834.

Hab. In Himalaya temperata, alt. 7000–10,000 ped. vulgaris et sæpissime epiphytica, a Bhotan! *Griffith,* ad Kashmir! (fl. Mai.) (v. v.)

Folia 1–2 unc. longa, interdum supra sparse pilosiuscula, plerumque longe petiolata. *Racemi* elongati. *Bracteæ* pedicellos superantes v. æquantes. *Flores* fusci (an semper?). *Petala* late obovata. *Filamenta* antheris duplo longiora. *Stylus* elongatus, breviter bifidus, stigmatibus capitatis. *Baccæ* rubræ.

c. *Flores* racemosi. *Calycis* tubus ultra ovarium longe productus.

7. RIBES NIGRUM (*L.*). Ramulis foliisque glaberrimis v. puberulis, foliis late ovato-cordatis 3–5-lobis lobis crenato-serratis, racemis breviusculis paucifloris, floribus (magnis) longe pedicellatis puberulis, bracteolis brevibus, calycis tubo late campanulato lobis reflexis obtusis, filamentis subulatis, baccis magnis glaberrimis.

Hab. In Himalaya et Tibetia occidentali temperata. Kunawur, alt. 8000–12,000 ped.! Kashmir! et Dras, alt. 7000–10,000 ped.! *T. Thomson.* (fl. Mai.) (v. v.)

Distr. Europa! et Siberia! usque ad Kamtchatka!

Frutex robustus glaberrimus. *Folia* 2–3 unc. longa. *Flores* virides. *Bracteolæ* pedicellis multoties breviores.—Variat hortis baccis nigris, violaceis, albis.

8. RIBES GRIFFITHII (*Hf. & T.*). Ramulis glabris, petiolis gracillimis basi ciliatis, foliis late ovato-rotundatis cordatis 3–7-lobis supra glaberrimis subtus secus nervos pubescentibus lobis argute serratis caudato-acuminatis, racemis longissimis pendulis laxifloris puberulis, bracteis elongatis linearibus oblongisve, floribus magnis, calycis tubo campanulato basi conico lobis lineari-oblongis obtusis reflexis, baccis magnis glaberrimis.

Hab. In Himalaya orientali temperata et subalpina. Bhotan! *Griffith.* Sikkim, alt. 10,000–13,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Species insignis. *Petioli* 2–3 unc. longi. *Folia* 2–3 unc. lata, lobis divaricatis in caudas productis, serraturis angustis, acutis. *Racemi* spithamæi! flexuosi. *Flores* dissiti, glaberrimi. *Bracteolæ* 2–3, pedicellos superantes, subulatæ. *Petala* obovato- v. oblongo-linearia, unguiculata. *Stamina* erecta, filamentis elongatis. *Stylus* bifidus. *Baccæ* pulcherrimæ, ovoideæ, rubræ, acerbissimæ.

9. Ribes rubrum (*L.*). Ramulis glaberrimis, foliis longe petiolatis petiolis basi ciliatis ovato-cordatis 3–5-lobis utrinque glaberrimis lobis subacutis grosse crenato-dentatis, racemis elongatis pendulis flexuosis pubescentibus, bracteis minimis recurvis, calycis tubo campanulato basi conico lobis brevibus obtusis, baccis glaberrimis.—*R. Himalense*, Dcne in Plant. Jacq. 66. t. 67, non Royle.

Hab. In Himalaya occidentali temperata, alt. 6000–10,000 ped., frequens a Kumaon! *Thomson*, &c., ad Marri, *Fleming*! (fl. Mai., Jun.) (v. v.)

Distr. Europa! Caucasus! Siberia tota!

Folia 1–3 unc. longa, supra interdum sparse pilosiuscula. *Racemi* foliis æquilongi, laxiflori. *Bracteæ* pedicellis brevibus sæpius breviores. *Flores* magni, flavo-virides, glaberrimi, petalis obovato-spathulatis; staminibus erectis, filamentis elongatis; stylo simplici.

Quid *R. Takare*, Don, Prodr. 208 (indeterminabilis).

Nat. Ord. CRASSULACEÆ.

(Conspectus Generum Floræ Indiæ.)

1. Tillæa, *L.* *Sepala* 3–5. *Petala* et *stamina* 3–5. *Squamulæ* hypogynæ 0. *Folliculi* 3–5, 2- v. polyspermi.—Herbæ *pusillæ*; foliis *oppositis*; floribus *axillaribus, parvis.*

2. Crassula, *L.* *Calyx* 5-partitus. *Petala, squamulæ* hypogynæ, et *stamina*, 5. *Folliculi* 5, oligo- v. polyspermi.—Herbæ v. frutices; foliis *alternis oppositisve*; floribus *albis roseisve, sæpius paniculatis.*

†3. Bryophyllum, *Salisb.* *Calyx* inflatus, 4-fidus, valvatus. *Corolla* hypocrateriformis, limbo 4-lobo. *Stamina* 8, corollæ inserta. *Glandulæ hypogynæ* oblongæ. *Folliculi* 4, liberi, polyspermi.—Suffrutices *erecti, carnosi*; foliis *oppositis, simplicibus v. imparipinnatis*; cymis *paniculatis.*

4. Kalanchoe, *Adans.* *Calyx* 4–5-partitus. *Corolla* hypocrateriformis; limbo 4–5-fido. *Stamina* 8–10, corollæ inserta. *Glandulæ hypogynæ* lineares. *Folliculi* 4–5, polyspermi.—Herbæ *basi frutescentes*; ramis *erectis*; foliis *oppositis, simplicibus pinnatisectisve*; floribus *cymoso-paniculatis.*

5. Umbilicus, *D.C.* *Calyx* 4–5-partitus. *Corolla* campanulata,

4-5-fida. *Stamina* 5–10, imæ corollæ inserta. *Squamulæ hypogynæ* obtusæ. *Folliculi* 5, polyspermi.—Herbæ; foliis *rosulatis alternisve simplicibus*; floribus *racemosis, rarius cymosis.*

6. SEMPERVIVUM, *L.* *Calyx* 6–20-partitus. *Petala* 6–20 libera v. basi connata. *Stamina* 12–40. *Squamulæ hypogynæ* apice truncatæ, dentatæ v. laceræ. *Folliculi* 6–20, polyspermi.—Herbæ, *rarius* suffrutices, *acaules v. caulescentes*; foliis *plerisque rosulatis*; floribus *cymosis, corymbosis, paniculatisve.*

7. SEDUM, *L.* *Sepala* 4–5. *Petala* 4–5. *Stamina* 8–10, perigyna, alterna petalis inserta. *Squamulæ hypogynæ* integræ v. apice emarginatæ, interdum minimæ v. 0. *Folliculi* 4–5, polyspermi.—Herbæ *erectæ v. diffusæ*; foliis *alternis rarius oppositis*; floribus *cymosis.*

8. TRIACTINA, *Hf. & T.* *Sepala* 5, minima. *Petala* 5. *Stamina* 10, perigyna, alterna petalis inserta. *Squamulæ hypogynæ* lineares. *Folliculi* 3, ad medium connati, polyspermi.—Herba *carnosula, subramosa*; foliis *alternis v. subverticillatis*; floribus *ramis cymæ laxe foliatæ sessilibus.*

Gen. I. TILLÆA, *L.*

1. *Tillæa pentandra,* Royle, Ill. 222 (nomen tantum); Edgew. in Linn. Trans. xx. 50.

Hab. In Himalaya occidentali tropica, alt. 1000–6000 ped. Kumaon! *Royle,* &c. Simla! et Chamba! *Thomson.* Panjab, ad Peshawur! *Vicary.* Concan! *Herb. Stocks.* Mont. Nilghiri! *Pl. Hohenacker.* Maisor! *Lobb.* (fl. Sept.–Nov.) (v. v.)

Gen. II. CRASSULA, *L.*

1. CRASSULA INDICA (*Decne in Plant. Jacq.* 61. t. 73. f. 1). Glaberrima, foliis radicalibus rosulatis spathulatis, caulinis alternis, cymis paniculatis.—*Sedum paniculatum,* Wall. Cat. 7227.

Hab. In Himalaya temperata, alt. 4000–8000 ped.! Bhotan! *Griffith.* Kumaon! Garwhal! Simla! *Blinkworth,* &c. Kunawur! *Jacquemont.* (fl. Aug.) (v. v.)

†Gen. III. BRYOPHYLLUM, *Salisb.*

†1. *Bryophyllum calycinum,* Salisb. D.C. Prodr. iii. 396; Wall. Cat. 7205; Wight in Hook. Bot. Misc. iii. 100, Suppl. t. 1; Wight & Arn. Prodr. 360. *Cotyledon rhizophylla,* Roxb. Fl. Ind. ii. 456. *C. calycina,* Roth, nov. sp. 217.

Hab. Locis calidis Bengaliæ, utriusque Peninsulæ Indiæ, frequens, ex Africa tropica? introducta. (fl. Dec.) (v. v.)

Gen. IV. Kalanchoe, *Adans.*

1. **Kalanchoe varians** (*Haworth in Phil. Mag.* N. S. vol. ix. 1829, p. 302). Glaberrima, foliis glaucis crenatis obtusis inferioribus simplicibus ovatis supremis trifoliolatis, panicula subcorymbosa, sepalis lineari-ovatis lanceolatisve acuminatis, corollæ lobis acuminatis.—*Wall. Plant. As. Rar.* ii. 53. t. 167, sub nom. *K. subamplectens,* Cat. 7222.

Hab. In Himalaya tropica, alt. 1000–4000 ped. Simla! *Webb, Thomson.* Kumaon! *Wallich, Strachey & Winterbottom.* Nipal! *Wallich.* Sikkim! *J. D. H.* Burmah! *Wallich.* (fl. Dec.) (v. v.)

2. **Kalanchoe grandiflora** (*Wall. Cat.* 7226). Glaberrima glauca, foliis obovatis, cymis laxe corymbosis, sepalis magnis ovatis oblongisve acutis, corollæ lobis ovalibus apice uncinatis.—*Wight & Arn. Prodr.* 359. *K. Wightiana,* Wall. Cat. 7225.—An var. *K. varians?*

Hab. Montibus Peninsulæ! regione tropica, *Wight,* &c. (fl. Dec.–Mai.)

3. **Kalanchoe floribunda** (*Wight & Arn. Prodr.* 359). Superne glanduloso-pilosa, foliis superioribus alternis lanceolatis crenatis, cymis paniculatis rarius elongatis, floribus racemosis, sepalis subulatis, petalis oblongis mucronatis.—*K. spathulata,* Wall. Cat. 7224, non D.C.

Hab. In Himalaya tropica. Simla! Garwhal! *Thomson.* Bhotan! *Griffith.* Behar monte Parusnath, alt. 4000 ped.! *J. D. H.* Montibus Peninsulæ! regione tropica, *Wight,* &c. Ceylon! *Walker,* &c. (fl. Dec.–Mart.) (v. v.)

4. **Kalanchoe laciniata** (*D.C. Plantes Grasses,* t. 100). Foliis pinnatifido-laciniatis varie sectis lobis lineari-elongatis subserratis dentatisve, sepalis patulis lanceolatis acuminatis, cymis paniculatis.—*D.C. Prodr.* iii. 395; *Wall. Cat.* 7221; *Wight & Arn. Prodr.* 360. *Cotyledon laciniata* et *C. heterophylla?* Roxb. Flor. Ind. ii. 456.

Hab. Bengal ad Patna! *Hamilton.* Montibus Peninsulæ regione tropica! *Roxburgh,* &c. (fl. Dec.)

Distr. Java, Moluccas.

5. **Kalanchoe teretifolia** (*Haworth in Wall. Plant. As. Rar.* ii. 53. t. 166). Foliis triangularibus decompositis pedato-tripinnatisectis, petiolis dilatato-subamplectentibus, floribus (parvis) paniculato-corymbosis numerosissimis.—*Wall. Cat.* 7223.

Hab. Birmah, montibus Taong Dong, *Wallich.*

Quid *K. acutiflora,* Haworth, Syn. 109; Andr. Bot. Rep. 560.

Gen. V. Umbilicus, *D.C.*

1. **Umbilicus Oreades** (*Dcne in Plant. Jacq.* 62, *et* U. luteus *in Ic.* 73. f. 2). Annua, glaberrima, caulibus cæspitosis basi ramosis ramis ascendentibus foliosis, foliis ($\frac{1}{4}$ unc. longis) in ramis sterilibus rosulatis

lineari-lanceolatis oblongisve aristato-acuminatis, caulinis linearibus acuminatis teretiusculis, floribus ad apices ramorum 2–3 nutantibus, sepalis erectis oblongis acutis, petalis albis basi connatis ovato-lanceolatis acutis uninerviis paulo brevioribus, staminibus 5, glandulis hypogynis linearibus, carpellis turgidis stylo brevi setiformi.

Hab. In Himalaya occidentali et alpina. Kashmir ad Pyr-Panjal, *Jacquemont.* Kumaon, alt. 14,000 ped.! *Strachey & Winterbottom.*

Herba carnosula, foliis *Sedo trullipetalo*, et floribus *Umbilico spathulato* subsimilis. *Rami* 2–4-unciales. *Flores* pro planta magni, albi, 4–5-meri. *Corolla* membranacea. *Stamina* corollæ æquilonga, basi petalorum marginibus sæpe adnata.

2. UMBILICUS SPATHULATUS (*Hf. & T.*). Glaberrimus, foliis ad apices propaginum rosulatis late petiolatis spathulatis acutis apiculatisve caulinis alternis lineari-oblongis, floribus subcorymbosis breve pedicellatis, sepalis 4–5 lineari-oblongis corollæ tubo duplo longioribus, corolla straminea profunde 4–5-fida lobis ovato-oblongis obtusis tubo ter longioribus, squamulis hypogynis linearibus apice dilatatis retusis, folliculis 5.

Hab. In Himalaya orientali temperata. Sikkim, alt. 10,000–12,000 ped.! (fl. Aug.) (v. v.)

Annua? *Caulis* repens, ascendens, basi ramos decumbentes (propagines) emittens, 3–4-pollicaris, simplex v. ramosus, foliosus, crassitie pennæ corvinæ. *Flores* subfastigiati, ½ unc. longi, nutantes, demum erecti.—Habitus et folia *Sedum adenotrichum* referunt.

Gen. VI. SEMPERVIVUM, *L.*

1. SEMPERVIVUM ACUMINATUM (*Dcne in Plant. Jacq.* t. 74. f. 1). Foliis radicalibus densissime rosulatis lineari-lanceolatis spathulatisve aristato-acuminatis glaberrimis, caulinis lineari-oblongis, floribus glabris, sepalis petalisque sub 8 subglandulosis, squamulis hypogynis lineari-oblongis obtusis.—*Sedum Moorcroftianum*, Wall. Cat. 7228, fid. Edgew. in Linn. Trans. xx. 49.

Hab. In Himalaya et Tibetia occidentali temperata et alpina. Garwhal! et Gugi! alt. 10,000–15,000 ped., *Strachey & Winterbottom.* Kunawur! *Jacquemont*, &c. Piti! *Thomson.* (fl. Aug.) (v. v.)

Sepala viridia, ovato-lanceolata, acuminata, corolla ter breviora. *Petala* sub 8, basi connata, ovato-lanceolata, acuminata, dorso alato carinata. *Folliculi* 8, subsetosi, membranacei, stylo filiformi; semina sulcata.

2. SEMPERVIVUM MUCRONATUM (*Edgew. in Linn. Trans.* xx. 49). Foliis radicalibus densissime rosulatis lanceolatis aristato-acuminatis glaberrimis v. margine ciliatis, caulinis lanceolatis floribusque longe pedicellatis glanduloso-ciliatis, sepalis petalisque sub 8, squamulis hypogynis obovatis retusis rotundatis v. oblique truncatis.—An var. *S. acuminati*?

Hab. In Himalaya occidentali subalpina. Kumaon! et Garwhal! alt. 10,000–12,000 ped.! *Edgeworth, Strachey & Winterbottom.* (fl. Aug.)

Sepala subulato-lanceolata, submembranacea, petalis triente breviora, dense glandulosa. *Petala* basi connata, lineari-lanceolata, aristata, carina dense glanduloso-pilosa. *Stamina* sub 16. *Folliculi* sub 6, stylo filiformi breviusculo.

3. SEMPERVIVUM SEDOIDES (*Dcne in Plant. Jacq.* t. 74. f. 2). Foliis radicalibus rosulatis lineari-oblongis obtusis tenuissime glanduloso-pilosis, caulinis lineari-obovatis, sepalis obovatis obtusis, petalis (sub 8) calycem staminaque superantibus ovatis lanceolatisve acutiusculis, ovariis attenuatis tenuissime glanduloso-pilosis.

Hab. Himalaya occidentali alpina. Kunawur et Kashmir, *Jacquemont.*

4. SEMPERVIVUM ALBUM (*Edgew. in Linn. Trans.* xx. 49). Foliis ciliatis radicalibus rosulatis obcuneatis carnosis, caulinis confertis imbricatis ovatis, sepalis pubescentibus petalis duplo brevioribus, petalis ovatis ciliatis albis.—An var. *S. sedoidis* foliis caulinis majoribus?

Hab. In Himalaya occidentali temperata. Kumaon, alt. 7000–8000 ped.! *Edgeworth.*

Gen. VII. SEDUM, *L.*

The *Sedums* are most abundant in the alpine, subalpine, and temperate regions of the Himalaya; in the former they are a very conspicuous feature of the vegetation of rocky, stony, or otherwise very barren places, where those of the *Rhodiola* section especially form large rounded patches of a deep green colour in spring, becoming a bright or lurid red or purple in autumn; some of them attain 18,000 feet of elevation, which is almost the limit of vegetable life. Though a few species are found as low as 4000 feet in the Western Himalaya, and 6000 in the Eastern, not one has been found in the Khasia Mountains, or in any part of India south of the Himalaya. The genus *Saxifraga* is the only other Himalayan one containing a great number of species which offers at all a parallel case to this, only one of its species being found in the Khasia, and none elsewhere in India.

The following sketch of the Himalayan Sedums requires more indulgence than even the Saxifrages, from the extreme difficulty of limiting the species in a living state, and the still greater one of detecting the characters of the dried ones. We have found it difficult to indicate any one organ as affording good characters throughout large suites of species, or of specimens of a species. Nevertheless they all resolve themselves into very natural groups,

whose characters we have attempted to give. Of all the organs, the rhizome is one of the best-marked; in most of the species, in all indeed of the *Rhodiola* section, it is very large and elongate, sending out few lateral roots, and bearing usually numerous simple annual branches from the axils of membranous bracts towards its apex; these rhizomes root deep amongst the rocks, and are often divided from the very base into several ascending or erect trunks, each of which, bearing flowering stems, cause the individual plants of some species to attain a great size and rounded or hemispherical form. Young specimens of these large-rhizomed species are recognized with great difficulty: they have few prostrate or ascending stems with smaller leaves, and fewer comparatively larger flowers; and we find, that both in collecting and in sorting our specimens, we have invariably been led to regard the seedling and young specimens as very different species from the old. Such seedlings spring up by the banks of rills which have transported the seeds from greater elevations, and as the plants do not under these circumstances attain their proper development, their true origin may long remain unsuspected by the most careful and observing collector.

The *Rhodiola* section have, further, almost always robust branches, are perhaps invariably polygamous, and have rather turgid follicles with recurved apices. The leaves are variable in form and toothing, the outer and inner branches from near the apex of the same rhizome having often more or less different foliage. The cymes of inflorescence are naked or bracteate; in some species they are reduced to one or two flowers. The male flowers are often different-looking from the female, having narrower sepals and petals, which do not grow or dilate after flowering, as the sepals of the female plants sometimes do. The sepals are often unequal in size, most so in the male flower. The hypogynous glands do not afford very good characters, being variable in length and breadth, and in some species they are almost absent.

The remaining species are generally hermaphrodite, but not always so; they have usually more slender follicles with subulate or filiform erect styles.

The most alpine species are liable to excessive variation in stature, and size and colour of flower, from white to deep rose or red purple, and from orange to golden yellow. In most species the stamina are longer than the petals, and they generally preserve their proportionate length to a considerable degree; but frost-bitten specimens are often deceptive, and have sometimes very irregularly-developed petals; the latter are variable in shape in all the species. The number of parts in each floral whorl varies from 4–5 in most species, and the stamens from 8–10. In all, the alternate stamens are inserted on the petals, never more than half-way from the base, but to a very variable degree in many species.

In *Sedum multicaule* the divaricating follicles appear slightly connected at the base (as they are in *S. pallidum*, M.B., and others), which has made us very reluctant to propose the new genus *Triactina* for one of the Eastern Himalayan species whose habit agrees in many respects with that of *S. multicaule*. But the consolidation of the carpels in *Triactina* is complete up to their middle; their number is constantly only 3, which, and its very minute calyx and whorled leaves, together seem to indicate the propriety of keeping it separate. It links the very different and non-crassulaceous-looking American genus *Penthorum* with *Sedum* in a very remarkable manner.

A. RHODIOLA. *Flores* dioici, v. polygami. *Rhizoma* suberectum, crassum, squamatum. *Rami* suberecti, validi, foliosi, simplices. *Cymæ* terminales.

a. *Cymæ* densifloræ, nudæ; ramis non aut vix bracteatis foliatisve.

1. SEDUM RHODIOLA (*D.C. Prodr.* iii. 401). Foliis sessilibus obovatis oblongisve serrato-dentatis, cyma congesta composita, floribus 4–5-meris breve pedicellatis flavidis, squamulis hypogynis late lineari-oblongis obtusis, stylo recurvo, stigmate discoideo.—*Led. Flor. Ross.* ii. 179.

Hab. In Himalaya et Tibetia occidentali subalpina et alpina; frequens, a Garwhal! ad Kashmir! alt. 12,000–17,000 ped., *Strachey & Winterbottom*, &c. (fl. Jul.) (v. v.)

Distr. Terris arcticis totis! et montibus Europæ! Asiæ! et Americæ borealis!

Variat insigniter statura, latitudine foliorum et magnitudine florum. *Flores* interdum gracile pedicellati. *Calyx* petalis brevior, interdum brevissimus. *Petala* lineari-lanceolata v. anguste linearia. *Stamina* petalis 2–3plo longioribus. *Glandulæ hypogynæ* interdum oblique trifidæ.

2. SEDUM HETERODONTUM (*Hf. & T.*). Ramis robustis, foliis sessilibus basi rotundatis cordatis v. auriculato-bilobis ovatis grosse irregulariter inciso-dentatis, cyma densissime congesta capitata, floribus 4-meris sessilibus roseis?, squamulis hypogynis ut in *S. Rhodiola*, stylo recurvo, stigmate parvo.—An forma *S. Rhodiolæ*?

Var. *a.* Foliis basi non aut vix cordatis profunde dentatis.

Var. β. Foliis basi auriculato-bilobis, minus dentatis.

Hab. In Himalaya occidentali temperata et alpina. Var. *a.* Kunawur! Kishtwar! et Kashmir! alt. 8000–12,000 ped., *T. Thomson, Lance.* Var. β. Kishtwar, alt. 12,000–14,000 ped.! *T. Thomson.* (fl. Aug.) (v. v.)

Statura elatior quam *S. Rhodiola*; folia multo latiora, grosse eroso-dentata; flores densius congesti sæpius in globum aggregati, juniores virides demum rosei? v. rarius flavi? *Sepala, stamina* et squamulæ hypogynæ variabiles.

3. SEDUM CRENULATUM (*Hf. & T.*). Ramis crassis, foliis subsessilibus imbricatis ovato- v. obovato-oblongis crenulatis, cymis sessilibus dense congestis foliis supremis involucratis, floribus 4–5-meris, pedicellis longitudine calycis, sepalis anguste linearibus, glandulis hypogynis lineari-oblongis obtusis, stigmatibus discoideis.

Hab. In Himalaya alpina. Kumaon, 12,000 ped.! *Blinkworth, Strachey & Winterbottom.* Nepal? *Wallich.* Sikkim, alt. 14,000–18,000 ped. vulgatissimum! *J. D. H.*; et in Tibetia occidentali alpina, Gugi, 16,800 ped.! *Strachey & Winterbottom.* (fl. Aug.) (v. v.)

Rhizoma elongatum, crassitie pollicis et ultra. *Rami* numerosissimi, ascendentes, robusti, 3–5 poll. longi. *Folia* $\frac{1}{3}$–$\frac{1}{2}$ unc. longa. *Flores* 4–5-meri, rarius hermaphroditi. *Sepala* sæpe purpurea. *Petala* rosea, in exemplaribus e Kumaon flava?

b. *Cymæ* laxifloræ v. paucifloræ, ramulis non aut raro foliatis, interdum unifloris, v. floribus solitariis.

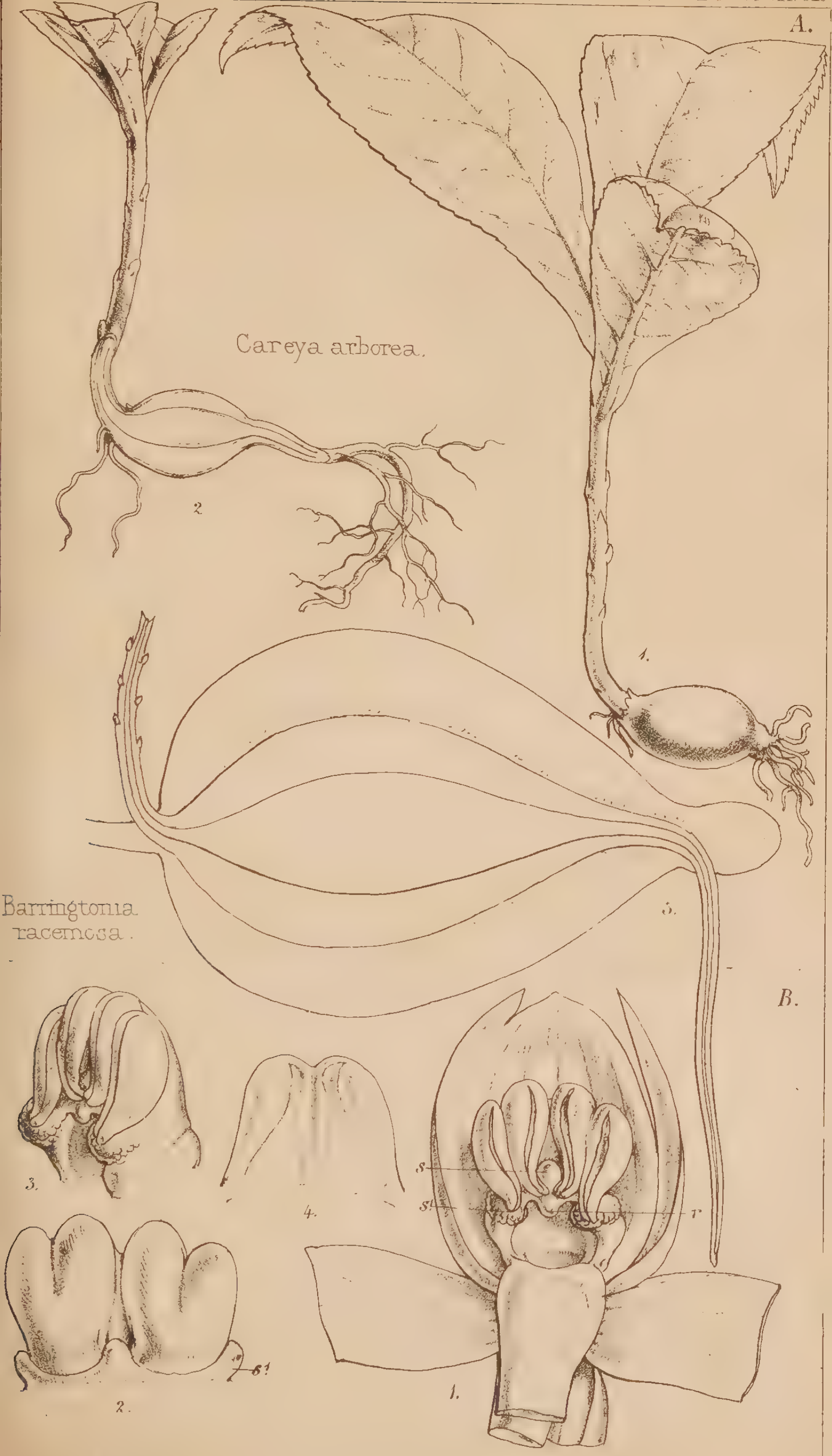
4. SEDUM TIBETICUM (*Hf. & T.*). Rhizomate ramis vetustioribus onusto, caulibus erectis graciliusculis, foliis ($\frac{1}{3}$–$\frac{1}{2}$-pollicaribus) sessilibus crassis semiteretibus? lineari-oblongis acutis obtusisve integerrimis obscure dentatis, cymorum ramis (fructu) distinctis, folliculis turgidis apice uncinato-recurvis.

Hab. In Himalaya et Tibetia occidentali alpina. Kunawur ad Werang! et Ladak! alt. 12,000–16,000 ped.! *T. Thomson.* Gugi! *Strachey & Winterbottom.* Affghanistan! *Griffith* (1684). (fl. Jun., Jul.) (v. v.)

Rhizoma crassitie pollicis. *Rami* interdum basi decumbentes v. ascendentes, crass. pennæ columbinæ. *Folia* subtus convexa. *Flores* rubri?

5. SEDUM STRACHEYI (*Hf. & T.*). Ramis gracilibus curvis, foliis parvis ($\frac{1}{4}$–$\frac{1}{3}$-pollicaribus) sessilibus planis ovatis ovato-oblongisve obtusis crenatis subsinuatisve, cymis parvis, floribus pedicellatis, petalis calyce duplo longioribus, glandulis hypogynis lineari-oblongis emarginatis, folliculis subturgidis apice recurvis.

Hab. In Tibetia occidentali alpina. Piti! Parang! Nubra! &c., alt. 13,000–17,000 ped., *T. Thomson & H. Strachey* (fl. Jul.) (v. v.)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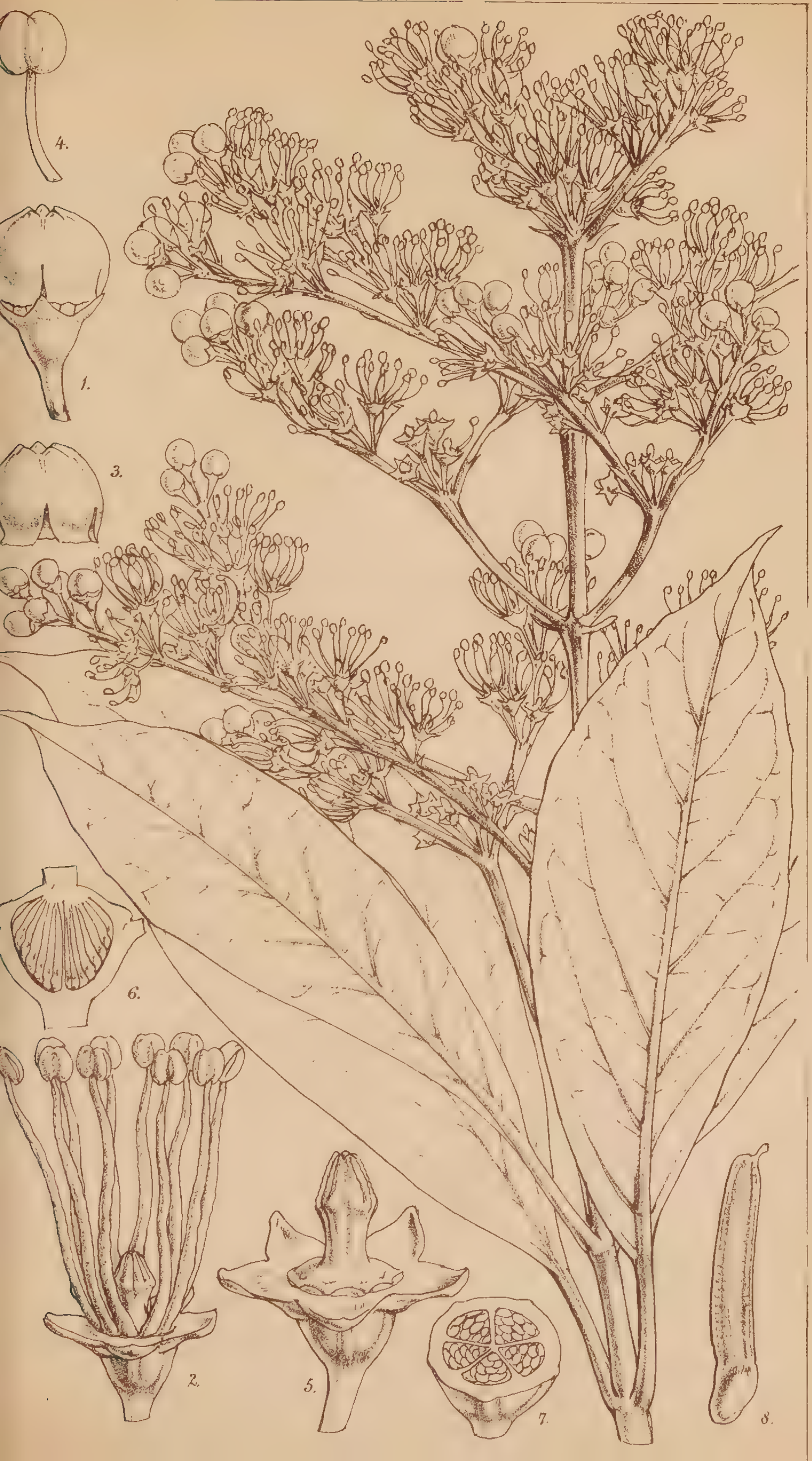
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S. crenulato affine sed rhizomate ramisque gracilioribus, foliis floribusque minoribus.—*Rhizoma* crassitie pennæ anserinæ, squamis apicem versus $\frac{1}{4}$ unc. latis. *Rami* 4–6 unc. longi. *Folia* pallide viridia. *Cymæ* $\frac{1}{2}$–$\frac{2}{3}$ unc. latæ, densifloræ. *Sepala* purpurea. *Petala* fl. ♂ alba v. rosea; fl. ♀ rosea v. purpurea. *Folliculi* $\frac{1}{5}$–$\frac{1}{4}$ unc. longi.

6. SEDUM QUADRIFIDUM (*Pallas, It.* iii. *App.* 730. t. 6. f. 1). Humile, rhizomate crassissimo, ramis brevibus ascendentibus erectisve, foliis confertis teretiusculis obtusis v. acutis ($\frac{1}{6}$–$\frac{1}{4}$ unc. longis), cyma 6–8-flora, floribus 4–5-meris breve pedicellatis, folliculis apice recurvis, glandulis hypogynis subquadratis retusis emarginatis truncatisve.

Var. *α*. Glaberrima, foliis obtusiusculis, cymis 6–8-floris.

Var. *β*. Glaberrima v. puberula, foliis acutiusculis marginibus sicco recurvis, ramis 1–2-floris.

Var. *γ*. *Scoparia*; rhizomate abbreviato crassissimo, ramis densissime confertis, foliis glaberrimis lineari-teretiusculis subacutis, floribus solitariis sessilibus.—An species distincta?

Var. *δ*. *Coccinea*; rhizomate crassissimo, ramis perplurimis foliisque patenti-recurvis subacutis acuminatisve glanduloso-puberulis marginibus sicco recurvis, cymis densifloris v. laxifloris.—*S. coccineum*, Royle, Ill. 223. t. 48.

Var. *ε*. *Acuminata*; puberula, rhizomate crassissimo, ramis perplurimis 2-pollicaribus gracilibus, foliis subulato-lanceolatis, acuminatis, marginibus planis.

Hab. In Tibetia et Himalaya alpina, alt. 13,000–18,000 ped. (fl. Jul., Aug.) (v. v.)

Var. *α*. Gugi, alt. 15,000 ped.! *Strachey & Winterbottom.* Kishtwar! et Zanskar! alt. 14,000–16,000 ped., *T. Thomson.*

Var. *β*. Kunawur! et Kishtwar! alt. 13,000–16,000 ped., *T. Thomson.*

Var. *γ*. Sikkim, alt. 16,000–18,000 ped.! *J. D. H.*

Var. *δ*. Kishtwar, 15,000–16,000 ped.! *Herb. Royle, T. Thomson.*

Var. *ε*. Kumaon! *Blinkworth*; Garwhal, alt. 10,500 ped.! *Strachey & Winterbottom.*

Distr. Rossia et Siberia arctica! Montibus Altai! Baikal et Dahuriæ!

Planta variabilis, cujus exemplaria juniora rhizomate nondum incrassato ramisque paucis ascendentibus ab vetustioribus primo intuitu diversissima apparent. *Flores* purpureæ, parvæ. *Stamina* plerumque petalis longiora, sed interdum (floribus vere gelatis?) abbreviatis.

c. *Cymæ* laxifloræ; ramis foliosis, v. floribus folio bracteatis.

7. SEDUM HIMALENSE (*Don, Prodr.* 212). Rhizomate crasso, ramis erectis ascendentibusve foliosis, foliis planis ($\frac{1}{3}$–$\frac{2}{3}$-pollicaribus) obovato- v. oblongo-cuneatis lanceolatisve acutis acuminatisve apices versus dentatis, cymis evolutis foliosis, floribus pedicellatis ♂ planis, petalis lanceolatis sordide purpureis stamina subæquantibus, glandulis hypogynis atratis late triangularibus, folliculis turgidis apice recurvis.—

D.C. Prodr. *S. Himalayanum*, Wall. Cat., et *S. hypericifolium*, Wall. Cat.; in part. cf. *S. atropurpureum*, Turcz.

Hab. In Himalaya centrali et orientali alpina. Nipal! *Wallich.* Sikkim, alt. 13,000–17,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Rami 6–14 unc. alti, folia superiora ramulique cymæ glaberrimi v. puberuli. *Flores* ♂ $\frac{1}{6}$–$\frac{1}{4}$ unc. lati. *Sepala* subulata, petalis dimidio breviora. *Folliculi* atro-purpurei, $\frac{1}{4}$ unc. longi.

8. SEDUM BUPLEUROIDES (*Wall. Cat.* 7229). Ramis graciliusculis elongatis, foliis polymorphis ($\frac{2}{3}$–2 pollicaribus) ovatis orbicularibus ovato-oblongisve acutis integerrimis basi rotundatis cordatis v. auriculato-bilobis, cyma effusa ramis divaricatis effusis foliosis, floribus ♂ planis sessilibus pedicellatisve, petalis lanceolatis atro-purpureis staminibus longioribus, glandulis hypogynis late cuneato-quadratis retusis lobatisve, folliculis turgidis apice uncinato-recurvis.

Hab. In Himalaya centrali et orientali subalpina et alpina. Nipal! *Wallich.* Sikkim, alt. 10,000–14,000 ped.! *J. D. H.* (fl. Jul. August.) (v. v.)

Rhizoma breve. *Caules* elongati, glaberrimi v. apices versus ramulique cymæ puberuli. *Cyma* laxa, dichotoma, ramosa, foliosa, 2–4 unc. diametro. *Glandulæ* hypogynæ magnæ, atro-purpureæ.

9. SEDUM ELONGATUM (*Wall. Cat.* 7233). Rhizomate brevi crasso, ramis paucis elongatis, foliis (1–2 pollicaribus) sessilibus petiolatisve cuneato-oblongis obovatis lanceolatisve supra medium obtuse dentatis crenatisve, cymis effusis dichotomis ramosis, ramis divaricatis foliosis elongatis, floribus ♂ planis gracile pedicellatisve, petalis lanceolatis atro-purpureis staminibus brevioribus, glandulis hypogynis late cuneato-quadratis bilobis, folliculis turgidis apice subhamato-recurvis.

Var. *α*. Foliis petiolatis.

Var. *β*. Foliis lineari-oblongis basi lata subcordata sessilibus.—An species distincta?

Hab. In Himalaya temperata. Kumaon! *Blinkworth*; *Strachey & Winterbottom.* Nipal! *Wallich.* Sikkim, alt. 10,000–12,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Var. *β*. Kumaon! *Blinkworth.*

Rhizoma breve. *Caules* 1, v. pauci elongati, pedales et ultra. *Folia* sicca pro genere submembranacea, latitudine varia, pallide viridia. *Cyma* late divaricatim ramosa.—*S. bupleuroidi* subsimilis, sed staminibus petalis longioribus.

10. SEDUM FASTIGIATUM (*Hf. & T.*). Rhizomate crasso, ramis plurimis erectis ascendentibusve, foliis patulis ($\frac{1}{4}$–$\frac{1}{3}$ pollicaribus) linearibus teretiusculis acutis obtusisve, cymis 3–8-floris simpliciusculis, ramulis brevibus, pedicellis foliatis, petalis suberectis linearibus stamina æquantibus, glandulis hypogynis in fl. ♀ quadratis, in fl. ♂ lineari-oblongis, folliculis turgidis apicibus brevibus recurvis.

Hab. Himalaya orientali alpina. Sikkim, alt. 14,000–17,000 ped.! (fl. Aug.) (v. v.)

S. quadrifido affine sed majus, cymarum ramis pedicellisve florum 1-foliatis, et floribus folliculisque multo majoribus. *Rhizoma* crassitie digiti, perpendiculare. *Rami* plantæ ♂ graciles, 3-pollicares; in plant. ♀ robustiores, 4–5 pollicares. *Glandulæ* hypogynæ ut videtur valde variabiles, in fl. ♀ florentes longiores quam latæ sed post anthesin latiores quam longæ; in plant. ♂ semper longiores, apice truncatæ v. lobulatæ.

11. Sedum humile (*Hf. & T.*). Rhizomate pro planta crassissimo ramis vetustis dense scopario, ramis brevibus decumbentibus v. suberectis (pollicaribus), foliis linearibus lineari-oblongisve obtusis, floribus pro planta magnis ad apices ramorum solitariis v. 2–3 breve pedicellatis, 4–5-meris, sepalis ovatis subulatisve obtusis, petalis lanceolatis stamina subæquantibus, glandulis hypogynis late quadratis, folliculis turgidis, stylo recurvo.

Hab. In Himalaya orientali alpina. Sikkim, alt. 14,000–16,000 ped.! *J. D. H.* (fl. August.) (v. v.).

Proxime affine *S. quadrifido* et *S. fastigiato*; a priore differt floribus majoribus, foliis latioribus, a *S. fastigiato* statura humili, sepalis latioribus, floribusque minoribus.

12. Sedum coriaceum (*Wall. Cat.* 7328). Rhizomate crasso, cyma foliisque utrinque puberulis, foliis planis obovatis ($\frac{1}{3}$ unc. longis), cyma paucifoliata.

Hab. Nipal! *Wallich.*

S. Stracheyi simile sed totum puberulum, foliis obovatis et cyma pauciflora.

B. *Flores* hermaphroditi, rarius imperfecti. *Folliculi* subpedicellati. *Styli* fere recti, graciles, non aut vix recurvi. *Rhizoma* crassum, elongatum, perpendiculare v. horizontale.

13. Sedum crassipes (*Wall. Cat.* 7234). Ramis numerosis spithamæis simplicibus suberectis graciliusculis, foliis patulis planis anguste linearibus remote dentatis, cyma densiflora foliis involucrata, pedicellis brevibus bracteatis, floribus majusculis pallidis, petalis lanceolato-spathulatis staminibus paulo brevioribus, glandulis hypogynis brevissimis subquadratis, folliculis lanceolatis, stylo filiformi-subulato.

Hab. In Himalaya subalpina et alpina. Garwhal, alt. 10–500 ped.! *Strachey & Winterbottom.* Nipal! *Wallich.* Sikkim, alt. 12,000–16,000 ped.! *J. D. H.* (fl. Jul.–Sept.) (v. v.)

Plantæ juniores humiles, rhizomate parvo, ramis decumbentibus 2–4 pollicaribus, foliis $\frac{1}{4}$–$\frac{1}{2}$ pollicaribus, integerrimis dentatisve; vetustiores rhizomate crassitie pollicis, ramis spithamæis et ultra. *Folia* suprema cymam superantia. *Petala* straminea. *Flores* interdum unisexuales.

14. SEDUM LINEARIFOLIUM (*Royle, Ill.* 222. t. 48). Rhizomate ramoso, ramis breviusculis glabris glanduloso-pubescentibusque, foliis ($\frac{1}{3}$ pollicaribus) linearibus dentatis, floribus subsolitariis (magnis!) petalis patulis lanceolatis acuminatis stamina superantibus, glandulis hypogynis quadratis retusis, folliculis subturgidis, stylo gracili.

Hab. In Himalaya occidentali temperata, Kumaon! *Royle.*

Rhizoma crassitie digiti minoris. *Rami* pollicares et ultra. *Flores* 1–3, expansi $\frac{1}{2}$–$\frac{2}{3}$ unc. diametro! *Petala* rubra? sepalis viridibus vix duplo longiora.

15. SEDUM PAUCIFLORUM (*Edgew. Linn. Trans.* xx. 49). Rhizomate crassissimo, ramis gracilibus glaberrimis, foliis linearibus integerrimis v. apices versus paucidentatis, cymis 6–8-floris, floribus pedicellatis bracteatis, sepalis ovatis, petalis ovato-lanceolatis stamina superantibus, glandulis hypogynis parvis orbiculari-quadratis, folliculis subturgidis, stylo gracili. *S. mucronatum,* Edgew. *l. c.*

Hab. Himalaya occidentali temperata. Kumaon, alt. 8000–10,000 ped.! *Royle, Edgeworth,* &c. (fl. Jul.)

S. linearifolio, Royle, affine; differt præcipue cyma 6–8-flora rarius pauciflora, sepalis brevioribus ovatis. *Antheræ* mucronatæ et muticæ in eodem specimine (mucrone verisimiliter deciduo).

16. SEDUM TRIFIDUM (*Wall. Cat.* 7230). Rhizomate breviusculo crasso, ramis gracilibus, foliis 1–3 pollicaribus lineari-lanceolatis spathulatisve late petiolatis grosse serratis sinuato-pinnatifidis lobatisve lobis obtusis, cymis ramosis foliatis, floribus pedicellatis, sepalis subulato-lanceolatis, petalis lineari-lanceolatis stamina subæquantibus, glandulis hypogynis quadratis, folliculis stylo gracili. *S. sinuatum,* Royle, MSS. Ill. p. 222; Edgew. in Linn. Trans. xx. 47.

Hab. In Himalaya temperata, alt. 6000–10,000 ped., rupibus et truncis arborum epiphytica; a Simla! *Comta. Dalhousie,* ad Sikkim! *J.D.H.* (fl. Aug.) (v. v.)

Planta valde variabilis. *Rhizoma* sæpe deforme. *Rami* spithamæi ascendentes. *Folia* interdum late obovato-spathulata. *Flores* plerumque rosei, sæpius remoti, interdum foliis lobatis bracteati.

17. SEDUM WALLICHIANUM (*Hook. Ic. Plant.* t. 604). Rhizomate crasso elongato, ramis plurimis erectis, foliis sessilibus (pollicaribus) lineari-lanceolatis grosse serratis v. interrupte pinnatifidis supremis cymam superantibus, cymæ ramis breviusculis foliatis, petalis suberectis linearibus staminibus æquilongis, glandulis hypogynis cuneato-quadratis late truncatis, folliculis angustis rectis, stylo gracili suberecto. *S. asiaticum,* Wall. Cat. 7239, B. in part. non D.C.

Hab. In Himalaya occidentali subalpina. Kumaon, alt. 10,000–12,000 ped.! *Blinkworth*; *Strachey & Winterbottom,* &c.

Glaberrimum. *Rami* spithamæi, crassitie pennæ columbæ. *Folia* carnosula, acuta, infra medium integerrima v. serrata, interdum interrupte pinnatifida lobata v. dentata. *Cyma* planiuscula, sed non densiflora, foliis supremis involucrata. *Flores* pedicellati v. sessiles. *Sepala* linearia, petalis ½ breviora.—Habitus *S. imbricati* sed floribus rubris. *S. trifido* simillimum, sed differt rhizomate elongato crasso, ramis vetustis persistentibus, foliis uniformibus floribusque dioicis polygamisve.

18. SEDUM IMBRICATUM (Hf. & T.).
Hab. Himalaya occidentali alpina. Kumaon, alt. 11,000 14,500 ped.! *Strachey & Winterbottom*; *Edgeworth.* Kunawur et Tibetia occidentali! *T. Thomson.* (fl. Jun. Jul.) (v. v.)
Habitus et squamæ rhizomatis *S. Rhodiolæ,* sed flores sæpius hermaphroditi et folliculi angusti pedicellati, stylo gracili recto. Ab *S. Wallichiano* et cæteris hujus sectionis differt squamis rhizomatis, staminibusque petala longe superantibus.

C. Annuæ v. perennes (rhizomate nullo). *Folia* imbricata v. rosulata. *Flores* hermaphroditi.
a. *Folia* rosulata, caulina alterna. *Folliculi* 5, erecti, stylo filiformi recto.

19. SEDUM ROSULATUM (*Edgew. in Linn. Trans.* xx. 48). Superne glanduloso-pilosum (var. β. glaberrima), ramis gracilibus ascendentibus, foliis glabris radicalibus rosulatis petiolatis obovato-spathulatis caulinis parvis sparsis, floribus corymboso-paniculatis pedicellatis, petalis obovato-lanceolatis albis obtusis stamina superantibus, glandulis hypogynis nullis v. minimis, folliculis turgidis membranaceis, stylo gracili filiformi. *S. pyriforme,* Royle, Herb.
Var. β. Glaberrima.
Hab. Himalaya occidentali temperata, alt. 5000–9000 ped.! Kumaon! *Edgeworth.* Simla! Kunawur! & Jamu! *Thomson.* Var. β. Simla! *Comta. Dalhousie.* Kumaon! *Thomson.* (fl. Mai.–Jun.) (v. v.)
Folia ⅓–⅔ poll. longa, apice rotundata obtusa v. apiculata. *Rami* graciles, 2–4 poll. longi. *Flores* albi. *Petala* calyce duplo longiora, apice obtusa, acuta v. oblique truncata. *Folliculi* albi.

20. SEDUM ADENOTRICHUM (*Wall. Cat.* 7231). Superne glanduloso-pilosum, ramis gracilibus, foliis glabris, radicalibus rosulatis carnosis late petiolatis spathulato-cuneatis acutis mucronatisve, caulinis paucis sessilibus, floribus cymoso-paniculatis pedicellatis, pedicellis calycibusque glanduloso-pilosis, petalis lanceolatis acuminatis stamina superantibus, glandulis hypogynis parvis, folliculis membranaceis, stylo gracili; *Edgew. Linn. Trans.* xx. 48.
? Var. β. glaberrima.
Hab. Himalaya occidentali temperata, alt. 3000–8000 ped.! Kumaon! *Blinkworth,* &c. Kashmir! & Jamu! *Thomson.* Marri, *Fleming.* Var. ? β. Bhotan! *Griffith* (fl. Jul. Aug.) (v. v.).
S. rosulato affine et habitu simillimum; differt foliis minoribus cras-

sioribus angustioribus, petalisque acuminatis. *Folia* $\frac{1}{3}$–$\frac{1}{2}$ unc. longa, sicca tenuiter marginata. *Sepala* ovato-lanceolata, petalis dimidio breviora. *Glandulæ hypogynæ* oblongæ, emarginatæ.—Habitus et folia radicalia *Umbilici spathulati.*

21. SEDUM TRULLIPETALUM (*Hf. & T.*). Annuum, glaberrimum, cæspitosum, caulibus sterilibus brevibus foliis parvis ($\frac{1}{4}$-pollicaribus), dense imbricatis ovato-oblongis aristato-acuminatis carnosis, floriferis erectis laxius foliatis apice corymboso-ramosis, cymis densifloris, petalis unguiculatis lamina ovato-lanceolata carinata staminibus æquilongis, glandulis hypogynis minimis oblongis retusis, folliculis in stylum gracilem angustatis.

Hab. In Himalaya alpina. Kumaon, alt. 14,000 ped.! *Strachey & Winterbottom.* Nipalia orientali et Sikkim, alt. 13,000-16,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Species parvula habitu ramosa, foliis *Tillææ,* sicco fusco-rubra, floribus viridibus exemplaribus luxuriantibus numerosissimis; petalis trulliformibus unguiculatis crasse carinatis albo virescentibus (sicco flavescentibus) ab congeneribus Himalaicis valde diversa. *Rami* floriferi 2–5 unc. alti. *Petala* latitudine varia, interdum anguste linearia.

b. *Folia* opposita.

22. SEDUM EWERSII (*Led. Fl. Alt.* ii. 191; *Flor. Ross.* ii. 182, et *Ic. Flor. Ross.* t. 58). Radice crasso multicipite, ramis ascendentibus, foliis oppositis orbiculato-obovatis obtusis integerrimis sinuato-dentatisve supremis sæpius cordatis, cyma ramosa corymbosa multiflora. *S. Gerardianum,* Wall. Cat. 7235. *S. azureum,* Royle, Ill. 222. t. 48. f. 2. *S. rubrum,* Royle, l. c. 222; Edgew. in Linn. Trans. xx. 47.

Hab. In Himalaya occidentali temperata et alpina, alt. 12,000–17,000 ped., a Kumaon! *Strachey & Winterbottom,* ad Kashmir! *Thomson,* necnon in Tibetia occidentali alpina et temperata vulgaris, *Thomson.* (fl. Jun.–August.) (v. v.)

Distr. Sibiria alpina! et Soongaria!

c. *Folia* alterna. *Folliculi* 3–5, maturi divaricati, liberi v. una basi connati.

23. SEDUM PALLIDUM (*M. Bieb. Flor. Taur. Cauc.* i. 353 et iii. 314.) Annuum, pollicare, foliis teretiusculis linearibus obtusis sessilibus patentibus, cyma glandulosa puberula, petalis lanceolatis acuminato-cuspidatis calyce 4-plo longioribus, folliculis maturis divaricatis.—*Led. Flor. Ross.* ii. 185.

Hab. Punjab prope Peshawur! *Vicary.*

Distr. Levant! Tauria! Caucasus! Persia!

24. SEDUM MULTICAULE (*Wall. Cat.* 7232). Glaberrimum, caulibus basi ramosis, ramis ascendentibus, foliis sparsis linearibus teretiusculis acuminatis, floribus in cymas divaricatas seriatis sessilibus, petalis

ovato-lanceolatis longe acuminatis stamina superantibus, glandulis hypogynis parvis truncatis, folliculis 4–5 maturis divaricatis, stylo brevi subulato.—Cfr. *S. Japonicum*, Sieb.?

Hab. Himalaya temperata, alt. 4000–8000 ped. rupibus madidis truncisque arborum epiphytica, prope Peshawur! *Vicary*; Kumaon! & Simla! *Thomson*! *Strachey & Winterbottom*, &c.; Sikkim, *J. D. H.* (fl. Sept.) (v. v.)

Caules 3–6-pollicares, subrobusti. *Folia* $\frac{1}{3}$–$\frac{2}{3}$ unc. longa, aristato-acuminata. *Sepala* petalis subæqualia, viridia, acuminata. *Petala* flava v. interdum rosea?

25. SEDUM PERPUSILLUM (*Hf. & T.*). Annuum? subcæspitosum, glaberrimum, caulibus ramosis ascendentibus, foliis parvis ($\frac{1}{6}$ unc. longis) sessilibus linearibus (teretiusculis?) obtusis, floribus (pro planta magnis) terminalibus axillaribusque 4–5-meris, sepalis oblongis obtusis, petalis oblongis oblongo-lanceolatisve obtusiusculis staminibus æquilongis, glandulis hypogynis punctiformibus, folliculis turgidis post anthesin divaricatis oligospermis, stylo brevi subulato, seminibus muriculatis.

Hab. In Himalaya subalpina et alpina. Garwhal, alt. 15,000 ped.? *Strachey & Winterbottom*, Sikkim, alt. 12,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Caules $\frac{1}{2}$–1 pollicares, graciliusculi. *Folia* sicca plerumque basi saccata. *Flores* pro planta magni, breves, pedicellati, erecti. *Sepala* petalis paulo breviora, viridia. *Petala* alba. *Folliculi* virides, discreti.

Quid Rhodiola Asiatica, *Don. Prodr.* 213, quæ certe non *Sedum Asiaticum*, Wall. Cat., fid. descript. Donii?

Gen. VIII. TRIACTINA, *Hf. & T.*

1. *Triactina verticillata* (Hf. & T.).

Hab. In Himalaya orientali temperata; Sikkim sylvis humidis, alt. 10,000–12,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Planta singularis ob carpella 3 infra medium in capsulam 3-valvem connata, sed affinitate *Sedo multicauli* quam maxime affinis.—*Caules* suberecti, spithamæi et ultra, glaberrimi. *Folia* exemplaribus meis annua, caulina, pauca, verticillata v. alterna, petiolata obovata v. obcordata, integerrima, 1–1$\frac{1}{2}$ unc. longa, sicco membranacea, apice sæpius oblique retusa. Flores axillis foliorum cymæ laxifloræ sessiles, flavi; sepalis brevissimis, petalis ovato-lanceolatis acuminatis stamina subæquantibus; glandulis hypogynis linearibus apice dilatatis; folliculis 3, ad medium connatis, post anthesin divaricatis; *styli* graciles.

On a Monstrous Development in *Habenaria chlorantha*. By the Rev. J. S. Henslow, F.L.S., Prof. Bot. in the University of Cambridge. (Tab. I. B.)

[Read June 16th, 1857.]

The specimen was gathered at Gamlingay in Cambridgeshire on May 25, 1857. The monstrosity to be described was confined to a single (the lowest) flower of the spike, of which about half the flowers were expanded. An enlarged drawing of the flower accompanies the description (Plate I. B, fig. 1).

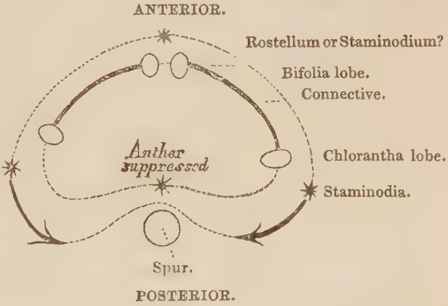
The anterior sepal is united with one of the lateral sepals. This gives a slight obliquity to the flower, especially shown at the base of the lip.

Instead of the usual two anther-lobes on the edges of a widely-expanded connective, there are four anther-lobes here developed. These are associated in pairs, and to all appearance belong to two stamens placed before the lateral petals, or, in other words, alternating with the anterior and lateral outer segments of the perianth. Admitting Mr. R. Brown's view of orchid structure, these stamens must belong to the inner whorl of three, of which the third, contiguous to the lip, is wholly suppressed. If the two anthers in the present specimen were confluent, and their anterior lobes suppressed, we should have the structure exhibited by *H. chlorantha*. But if the posterior lobes were suppressed, the result would offer the general aspect of *H. bifolia*; only the pollen masses in the anterior lobes in this specimen have not their caudiculæ terminated by retinacula. It should seem the development has not been complete; for there is a cavity just below the extremities of the caudiculæ, in which a mass of retinaculum has been formed, as though the supply for two had coalesced, and been cut off by a bursicula-like lobe which intervenes between them and the caudiculæ.

The lateral staminodia (*s'*.) are well formed, and extend a little behind the contiguous fertile stamens. There is also a projection (*s*) resembling a staminodium between the fertile stamens. It is in connexion with the bursicula-like lobe; and the bases of the contiguous anther-lobes are brought down in front of it. It therefore seems to be a staminodium belonging to the same *outer* whorl as the usual two well-marked staminodia! These appearances, if here correctly explained, are suggestive; and I venture to put the following questions:—

1. May not the two anther-lobes (in this genus and others, as

Orchis, *Ophrys*, &c. allied to it), usually regarded as belonging to one, viz. the anterior, stamen of the *outer* whorl, belong rather to two stamens (viz. one to each of the two lateral) of the inner whorl, their other lobe in such cases being abortive? Such a structure would bring these genera into closer affinity with *Cypripedium*, where both lobes of the two lateral stamens of the inner whorl are fertile, whilst the anterior stamen of the outer whorl forms the prominent staminodium of that genus. If this should prove to be the case, the rostellum (where it occurs) would be the representative of the anterior stamen of the outer whorl, and not a process from the stigma, as it is usually regarded. In the present specimen, the lateral staminodia appear connected by a continuous tissue, ranging outside the fertile stamens, with the rostellum-like process rising between them. The distortions or deviations from regularity which are in relation to the formation of lip and spur, seem here connected with the backward extension of the connectives, dragging (as it were) one anther-lobe of the two lateral stamens, whether fertile or barren (*staminodia*), of both whorls towards the lip, whilst the other lobes (the anterior ones) have a tendency to become approximated to each other. Thus, the least obliterated of the anther-lobes (generally termed staminodia) belonging to the two lateral stamens of the outer whorl assume a position a little *behind* the contiguous lateral stamens of the inner whorl.



The entirely suppressed posterior stamens of the inner whorl may be regarded as merged into the spur of the lip. Possibly the entirely suppressed posterior anther-lobes of those outer stamens which produce the lateral staminodia are in the same condition. If we suppose a case in which the posterior stamen of the inner whorl were developed, we might *à priori* anticipate the lip would be replaced by a regularly-formed petal. If I remember rightly, a case of this sort has been recorded and figured in a monstrous variety of *Orchis latifolia*.

Tab. I. B. fig. 1, portion of flower; 2, back, and 3, front view of column; all magnified.

A short Exposition of the Structure of the Ovule and Seed-coats of *Magnolia*. By Asa Gray, M.D., F.M.L.S., &c.

[Read November 19th, 1857.]

In 1848, I maintained, in the 'Genera of North American Plants Illustrated,' vol. i., that the seeds of *Magnolia* were not arillate, but *baccate*, or in other words, that the fleshy coat was the testa. In 1855 this view was criticised by my excellent and most ingenious friend Mr. Miers before the Linnean Society (see Ann. and Mag. Nat. Hist. for May 1855); and he, upon speculative grounds rather than from immediate observations, concluded that "there is no reason to doubt that in *Magnolia* the scarlet envelope is due to a subsequent growth over the primine," and is therefore an arillus. As soon as Mr. Miers' remarks reached me, I re-examined the ovules and young seeds of the plants in question; and the results of new observations by Mr. Sprague and myself were published in Hooker's 'Journal of Botany,' vol. vii. p. 243 (1855), and vol. viii. p. 26. The points which I supposed we had settled by direct observation were:—

1st, That no accessory covering, or arillus, was developed over or upon the primine of the ovule; but

2nd, That the fleshy envelope of the seed represents the primine or outer coat of the ovule; and

3rd, That the bony coat of the seed was represented in the ovule only by the innermost layer of young cells, lining the primine; which cells, multiplying by merismatic division during the growth of the seed, and their walls at length thickening and hardening irregularly, form the crustaceous or bony coat; so that the character of the seed is best expressed by the term "drupaceous."

Drs. Hooker and Thomson, about the same time (Flora Indica, p. 73) also insist that the fleshy coat is the testa; and notice the delicate third coat, closely adherent to the albumen, but without offering any opinion respecting the nature or origin of this and the crustaceous coat*.

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* Drs. Hooker and Thomson remark, that "the lateral position of the raphe with respect to the ovule and seed is worthy of note. It is well represented by Mr. Sprague in the plates of Asa Gray's work just quoted, but is not noticed in the text." If this refers to the pericarpic position of the raphes, that is only mentioned in the description of the ovules, although there is no need of it, as that position is the normal one (*vide* Gen. Ill. p. 10); if it refer to the position of the raphe on the middle of one of the broader sides of the seed, that is also noticed in the description of the seed.

I am not aware of any more recent direct investigation of the seeds of *Magnolia.* But in an elaborate memoir in the 'Transactions of the Linnean Society,' vol. xxii., Mr. Miers argues the question in detail, and reiterates his view formerly expressed, viz. "that the external fleshy envelope must be arilliform, the thick osseous nut must be the testa," &c.; that the raphe, or what he calls the "placentary sheath with its enclosed spiral vessels * * * afterwards becomes expanded by almost imperceptible degrees over the primine, until it finally envelopes it * * * and assumes the form of a distinct scarlet fleshy covering over the testa, being quite arilliform in its structure and appearance." And my excellent opponent goes on to state, that—"The only circumstance that bears any weight in the opposite view of the question, is one which certainly ought to have its due importance, and is one which I have never doubted in the smallest degree; viz. that Dr. Gray has watched the progress of the growth of the seed from the ovule, and could never detect any subsequent or extraneous production over the primine."

This "circumstance" does not appear to have had much weight, perhaps not so much as it was entitled to, considering that I had declared that very easy observation in the living plant sufficed to show that neither the fleshy nor the bony coat of the seed originated in the way Mr. Miers supposed, and had, moreover, asserted that I had arrived, from direct observations, at a different explanation of their nature and origin. Although not disposed to claim any particular authority for the observations made by Mr. Sprague and myself, even while they remain completely uncontradicted by any contrary observation, I may be allowed to express the opinion that a very simple and bare statement of what I said we saw, cannot properly be called an "argument," and still less, "ingenious reasoning." And I might equally object to having the candidly stated and unexpected discovery of the true origin of the bony coat (the only thing of any consequence which we have brought to light), described as an *ingenious substitution of an entirely new view of the subject*, if I were not well assured that my much-respected friend would, on reflection, at once disavow the implication.

My present object is simply to publish a selection from the sketches in which my observations (again repeated the present season) have been recorded by the accurate pencil of Mr. Sprague. They tell their own story, and are naturally entitled to more regard than my descriptive statement. I am indebted to the

Smithsonian Institution for leave to make the present use of the wood-cuts.

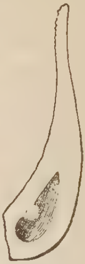

Fig. 1.

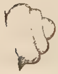

Fig. 2.

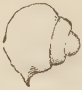

Fig. 3.

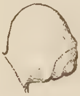

Fig. 4.

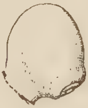

Fig. 5.

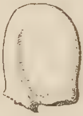

Fig. 6.

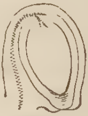

Fig. 7.

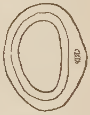

Fig. 8.

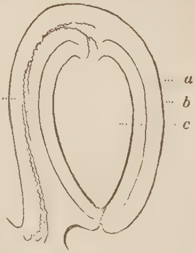

Fig. 9.

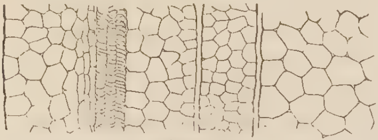

Fig. 10.

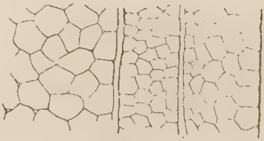

Fig. 11.

Fig. 1 represents a magnified vertical section of a pistil of *Magnolia umbrella*, from a flower-bud about thirty days before anthesis; showing one of the forming ovules, the other being cut away. The ovule at this time is an apparently homogeneous cellular protuberance. Fig. 2 represents the ovule a week or two later in a similar side-view: the two coats now appear as rings or shallow and thickened cups around the base of the nucleus. Fig. 3 is another ovule, as it appeared a few days later. Fig. 4, another a few days later. Fig. 5, one from a nearly full-grown flower-bud. Fig. 6, one from a just-opened blossom. Fig. 7, a vertical section of the same through the middle of the raphe. Fig. 8, a transverse section of the same. In both these sections the conspicuous cord of vessels of the raphe is shown to occupy a position about midway between the outer and inner surface of the primine, or external coat; and this continues to be its position throughout the growth of the seed. Fig. 9 is an outline section of a full-grown ovule, like fig. 7, but on a larger scale, so that the parts may be lettered and compared with the figures beneath: *a*, is the primine or outer coat; *b*, the inner coat; *c*, the nucleus. Fig. 10 represents a slice of the tissue from the left-hand side of fig. 9, through the raphe and primine combined, the inner coat and a little of the nucleus; and fig. 11, a corresponding slice from the right-hand side,—the parts lettered as in fig. 9, viz. *a*, the outer coat; *b*, the inner coat; *c*, a portion of the tissue of the nucleus of an unimpregnated ovule. The cells forming the inner lining of the primine at this time hardly differ from the rest except in their smaller size. Fig. 12 represents an impregnated ovule, or forming seed, of about a line and a half in length; its natural size is indicated by the perpendicular line at the right of the figure. The raphe, turned towards the eye, appeårs more prominent than in nature, except when the body is a little withered; it is then as conspicuous as is represented. Fig. 13 is a magnified vertical section of the same, answering to that of fig. 9: *a*, the primine, or outer seed-coat; *a*′, its inner lining assuming a different texture and appearance; *b*, the secundine or inner coat, already beginning to adhere slightly to the nucleus *c*. On the other side, *d* is the cord of vessels of the raphe. A slice of the tissue through *d*, and extending into the nucleus, sufficiently magnified to reveal the structure, is shown in fig. 14, the parts of which are correspondingly lettered. The cord of spiral vessels, with some forming pleurenchyma, is still found in about the middle of what becomes the fleshy coat of the seed, while a stratum of narrow horizontal cells (*a*′) are developing on its inner face.

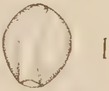

Fig. 12.

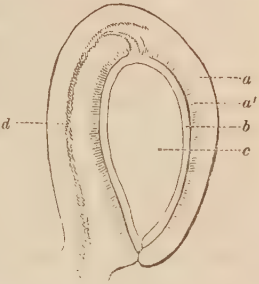

Fig. 13.

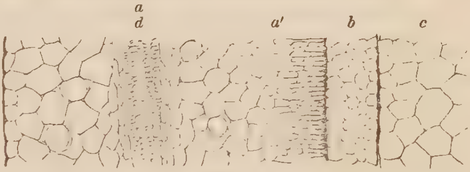

Fig. 14.

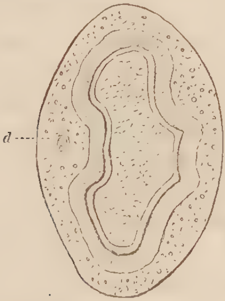

Fig. 16.

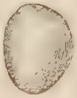

Fig. 15.

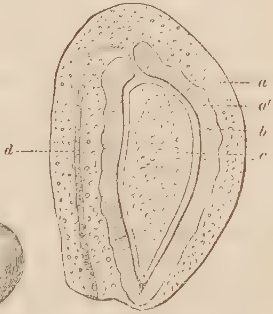

Fig. 17.

Our next stage exhibits the seed almost full-grown, and of the size represented in fig. 15. This is taken early in July, about three weeks before the cones begin to assume a rosy hue, and while the crustaceous coat of the seed, although well developed, is only of a firm fleshy texture, or just commencing to harden at the chalaza. The tissue of the fleshy coat is by this time well filled with scattered oil-receptacles. The raphe, visible externally when the seed is a little withered, when fresh is hardly more to be discerned than in a *Pæonia.* Fig. 16 is an enlarged cross-section of fig. 15; *d*, the cord of vessels of the raphe. Fig. 17, a longitudinal section; *a*, the fleshy outer coat; *a'*, the forming bony coat; *b*, the delicate inner coat, answering to the secundine of the ovule; *c*, the nucleus; *d*, the cord of vessels of the raphe. Fig. 18 is a section of the tissue of fig. 17, and answering to fig. 14; the parts correspondingly lettered. The only difference is that the about-to-be bony portion of the testa is more definite and has much increased in thickness. In ripening, this soon hardens, and at length its outer fleshy part turns red.

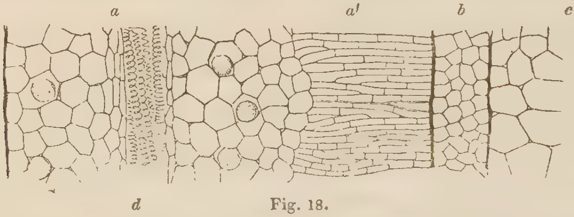

Fig. 18.

If these illustrations do not make the matter clear, the objector has only to examine the young seeds and ovules of *Magnolia* for himself. Although I do not perhaps completely understand how Mr. Miers arrived at the conclusions which he still maintains, I suspect it comes from his forming a wrong idea of the nature of the raphe, and from mistaking for the raphe in *Magnolia* the cord of vessels it contains. And I would ask him to make a comparative examination of the ovules and seeds of *Pæonia*; which, like many other anatropous seeds, at or before maturity, show no appearance of the raphe externally; in which the cord of vessels will be found more internal than in *Magnolia*, and yet where the fleshy surface of the seed will surely not be taken for an arillus, while the homologue of the latter is plainly visible at the base of the seed of most species. These seeds will also furnish convincing evidence that two, or even three, strata of very different texture may be developed from the primine or outer coat of the ovule.

Notes of a Botanical Ramble in the North of Spain. By JOSEPH WOOD, Esq., F.L.S. In a Letter addressed to R. KIPPIST, Esq., Libr.L.S.

[Read November 19th, 1857.]

MY dear Kippist,—I promised to give you some account of my botanizing in Spain, but I have done so little that I am afraid you will think it hardly deserving a reading at the Linnean Society. As we grow old, little obstacles, which we should at once have overruled in our youth, become serious hindrances; and some slight attacks of disease, my ignorance of the language, and still more, the impossibility in most cases of having a bedroom to myself, combined to limit my exertions.

We went by rail to Bayonne, and hastened our journey in order to proceed by a steam-packet which professes to pass weekly from Bayonne to Santander, and which was to leave the former place on Tuesday the 5th of May. On our arrival we found that it certainly would not start before Thursday. We therefore availed ourselves of a diligence just then on the point of setting off for Bilbao, where we were taught to expect another steamboat for Santander. We were again disappointed. The boat had been detained at Santander for some repairs. There is a diligence from Bilbao to that place, but as it is twenty-six hours on the road, while the steamer occupies only six, it seemed worth while to wait a little. We did not get away till Sunday the 10th of May, and arrived at Santander in the middle of a violent storm. Our return to Bayonne was hardly more fortunate, since a hole in the boiler obliged us to stop at Passages. We may hope that all these uncertainties will be remedied as the railway to Madrid advances, and the port of Santander becomes of more importance.

The country about Bilbao consists of woody or heathy hills in a somewhat loamy soil, belonging, it is said, to the lower chalk or upper greensand,—a formation which extends over a large portion of France and all along the north of Spain. We had a pleasant walk at Bilbao, but not very rich in botany. *Lithospermum prostratum* exhibits frequently on the banks its bright blue flowers; *Erica polytrichifolia* occurs here and there, and *E. vagans* almost everywhere. Its flowers had not yet made their appearance, whilst those of *E. polytrichifolia* were already dried up. *Dabœcia polifolia, Smilax aspera, Asphodelus albus, Quercus Ilex, Euphorbia procera,* and one or two plants of *Cistus salvifolius*, make up the list of those worth notice, but the weather was adverse to our researches.

The neighbourhood of Santander at first disappointed me, perhaps rather because there was not what I expected in the character of the vegetation, than from any absolute paucity of species. The hedges and general appearance of the country seemed very much like what we may see in England. A further examination, however, in a great degree corrected that impression. In the hedges we find *Laurus nobilis* and *Phillyrea media*, the latter very abundantly; and the banks are almost everywhere covered with *Scrophularia Scorodonia*, while *Smilax aspera* scrambles over the bushes. On the flowering branches the leaves have narrow divisions, while in those more distant from the flowers, the lobes assume the rounded form usually attributed to *S. mauritanica*. There are many rough bits of ground by road-sides, and some open spaces which might be called heaths. The largest of these seems doomed to perpetual barrenness from the custom of paring off the turf and carrying it away for fuel. In the others we meet with the *Dabœcia* and the *Lithospermum* already mentioned, and with *Erica vagans* and *Euphorbia verrucosa*. *Euphorbia procera* and *E. stricta* are also common about Santander: *Euphorbia platyphylla* is less plentiful. On these heaths are many spots of springy ground, adorned with several of our own more common bog plants,—*Hypericum Elodes*, *Anagallis tenella*, *Narthecium ossifragum*, &c., but no *Drosera*, and no *Pinguicula*. *Cyperus longus* is common. *Carex punctata* occurs in one or two places, and *Asphodelus albus* seems to prefer these moist situations. I found a *Carex* near my own residence at Fuente del Mar, which I at first put down as *C. genuensis*, but after a careful examination of different authors, I am inclined to consider *C. genuensis* as a nonentity, or at any rate a plant which it is impossible to identify. The one in question is probably a form of *C. glauca*, from which it differs in its larger size, the rounder and less pointed glumes of the fertile spikes, and by the rougher fruit. The spikes are erect, the fertile ones somewhat compound, the barren ones three or four in number, but these circumstances are occasionally found in *C. glauca*. Other plants not very common in England are, *Scilla verna*, *Vicia bithynica*, and *Lathyrus Nissolia*; and there are two or three plants not rare with us, which nevertheless may deserve notice. *Anthyllis vulneraria* is very common, but invariably with purple flowers. *Daucus Carota* abounds in all the meadows; it is white-rooted, and I think the same as our English species, though much larger and more luxuriant than when growing on the chalky downs about Lewes. *Linum angustifolium* is so abundant as to form in many pastures a considerable portion of the herbage. Two rarer plants, *Melilotus messanensis* and *M. parviflorus*, grow by the side of the embryo railway.

Almost everywhere about Santander we find a *Raphanus*, which I believe to be the *R. Landra* of the South of Europe. At the beginning of May the pods had uniformly one cell and one seed; as the season advanced the number of joints increased, and before I came away I found one or two pods with six joints. At that time the plant seemed to have attained its full development, and the more perfect pods (for there were still many of one or two joints) seemed originally to be furnished with five or six ovules, one or two of which were frequently abortive, leaving isthmuses in the pods. In all this it approaches to *R. maritimus*, and no satisfactory distinction has been pointed out between them.

These notes relate to my first arrival at Santander. A few days afterwards *Serapias cordigera* began to show its dark purple flowers in the meadows, frequently growing in company with *Orchis latifolia*. *Serapias Lingua* appears a little later. This is chiefly distinguished by the gland at the base of the label, which in *S. cordigera* is divided by a deep furrow through its whole length. In *S. Lingua* it is so divided only at its base, while the extremity is rounded and entire, or only marked by a slight dimple. Unfortunately these glands shrink almost to nothing in drying, and no distinct character can then be observed in them. Nevertheless the plants are still readily known by the smaller and fewer flowers of *S. Lingua*, by the smaller label and narrow form of its middle lobe. *S. oxyglottis* of Bertoloni is a mere synonym of *S. Lingua*, and its admission into the 'Tourist's Flora' was an error. *S. longipetala* is separated from *S. cordigera* not only by its narrower label, but by the flowers disposed in a lengthened spike, while in *S. cordigera* they are always approximated at the top of the scape. Amidst the great abundance of *S. cordigera* I was in hopes of finding the *S. triloba* of Viviani, but I looked in vain. A comparison of specimens satisfies me that the plant of Lloyd (Flore de la Loire inférieure) is the same as that of the Genoese botanist, and this, according to Godron, is a hybrid between *S. cordigera* and *Orchis laxiflora*. I did not see the latter species in Spain.

Towards the end of May *Oxalis corniculata* makes its appearance, and another *Oxalis*, which covers the ground under the

Indian corn and the larger vegetables. It is stemless, with an umbel of lilac flowers, and an anther-like double gland at the extremity of each sepal. The bulb is exceedingly compound, throwing off as the plant advances a great number of bulbels, and as it propagates itself also by seed, it is become a great pest in all the cultivated land. It is a recent addition to the Spanish flora, and is believed to have been introduced among some hay imported from South America for the use of the British legion.

Another plant of doubtful history which I must not omit to mention is a *Lathyrus* having much the appearance of the common sweet-pea, but with rather smaller flowers and a standard of deeper purple. The pod is however very different, quite smooth, much longer than that of *L. odoratus*, and with a greater number of contiguous, sessile seeds, which are somewhat mottled when ripe. It is, I believe, perennial, though where I saw it, it was growing abundantly in the midst of a bed of sweet-peas in Mr. Sewell's garden. It appears that Mr. Sewell's gardener had gathered seeds of *Lathyrus sylvestris*, which grows just outside the gate of the premises, and had mixed them with sweet-pea seeds, and he believes that the plant in question is a hybrid between *L. odoratus* and *L. sylvestris*. This seems very improbable; because the plant in question is earlier in flowering than either of its supposed parents, and because it forms a fuller pod than either of them, and with apparently perfect seeds.

Among the later plants which are found in the immediate neighbourhood of Santander, I will mention *Inula crithmoides*, *Lavatera cretica*, which takes the place of our *Malva sylvestris*, *Lepidium Draba*, *Linum gallicum*, *Linum strictum*, *Lobelia urens*, *Lotus hispidus*, *Lythrum Preslii*, *Malva parviflora*, *Polycarpon tetraphyllum*, *Scirpus Savii* (there is no *Scirpus setaceus*), *Scirpus nigricans*, *Scorzonera humilis*, *Silene nutans*, and *Viola lactea* of Smith. *Lythrum Preslii* was first noticed by Gussone, but is not admitted as a species in the 'Flora Italica' of Bertoloni, that writer considering it as a variety of *L. Græfferi*. It is however a much handsomer plant. The flowers are a great deal larger, while the teeth of the calyx are smaller and less unequal. Gussone describes the plant as suberect and the stem as winged, neither of which I found to be correct, though the stem has occasionally the appearance of a wing on one angle; a circumstance which occurs sometimes also in *L. Græfferi*. The leaves are somewhat cordate at the base, but *foliis oblongis, basi subcordatis* would be a more exact description than *foliis cordato*-oblongis. We find also a *Linaria*, which I am inclined to think the *L. Prestrandriæ* of DeCandolle, whether this be a good species or not; its flowers resemble those of *L. spuria* rather than of *L. Elatine*; but many of the leaves are hastate, or more often with large teeth at the base. I have found in England and elsewhere, a plant which, having nearly the flowers of *L. spuria*, had some of the leaves hastate, as in *L. Elatine*, and I have thought it might be a hybrid between them, but the teeth at the base struck me as something I had not observed before. I did not notice at Santander either *L. spuria* or *L. Elatine*: this plant seems to take the place of both. I have never seen the intermediate plant in Sussex, where both species are abundant, and often growing together.

There are two walks near Santander very beautiful in themselves and very interesting to the botanist. The first is to a rock called Peña di Castillo, or the Rock of Castillo. This is a rugged hill above 600 feet high, about a mile from the town, and itself nearly a mile long, but very narrow, so that you walk along the ridge with a rocky precipice on the one hand and a steep slope on the other. It rises abruptly from the general level, and is unconnected with anything else about it. It is, I believe, of mountain limestone, which is said in this part of Spain to abound in calamine: I am told that there are also two other limestone formations, one belonging to the lower chalk or greensand, and the other to the Jura limestone, but I cannot say that I learnt to distinguish them. This Peña di Castillo affords the most beautiful views over the bay of Santander and its surrounding mountains on the one side, while on the other the eye wanders over the nearer hills to the open Bay of Biscay. To the west, or rather I believe to the south-west, we distinguish three groups of mountains, which in May were entirely covered with snow. At the beginning of July, when I left Santander, two of these groups offered only detached spots and lines of snow. The third, the Sierras Albas, still exhibited it in great masses. All these masses are visible from Fuente del Mar, the house which was my very pleasant home. On this rock I first noticed *Genista hispanica*, *Erinus alpinus*, *Linaria origanifolia*, and *Teucrium pyrenaicum*, all of which I observed in various places afterwards. *Orchis parviflora* grows in tolerable plenty on the slope of the north side; but I was surprised to see on such a rock several moisture-loving plants, as *Valeriana dioica*, *Lathyrus palustris*, &c. There is also a small quantity of *Anemone Hepatica* and *Saxifraga Geum*. The ridge of the rock affords, however, the best harvest. Here were *Centranthus Calcitrapa* and *Conyza* *saxatilis* in abundance, *Osyris alba*, *Ruta bracteosa* (the three latter I found only in this place), *Euphorbia portlandica*, and *Stachys recta*. *Campanula Erinus* was abundant in one spot. There was also a large yellow *Orobanche*, which however I suspect to be only a variety of *O. major*. An abundant shrubby vegetation on a rocky soil prevented me from ascertaining on what plant it was growing. I noticed afterwards what appeared to be the same species on an old wall at Somahoz, but the labours of M. Reuter, in the 'Prodromus,' have rendered it impossible to determine the species of an *Orobanche*. It is very possible that a skilful botanist may distinguish species, where the differences are inappreciable by a less practised eye; but unless he can point out some characters which would enable a brother botanist to identify his plants, he renders the science only the more obscure by publishing them.

To return to La Peña: *Ficus carica* grows in the crevices of the rocks, and if not an original native, is now perfectly naturalized. Bushes of *Quercus Ilex* are found with prickly leaves: I mistook it at first for *Quercus coccifera*. At the foot of the Peña, in a meadow crossed by a track leading from some quarries down to the shore of the harbour, we find great abundance of *Serapias cordigera* mixed with the rarer *S. Lingua*, and I believe it was here that I gathered some specimens agreeing perfectly with *S. stricta* of Welwitsch, which is, I think, the *S. parviflora* of the 'Prodromus.' *Carum verticillatum* occurs on the same spot: and a little farther from the Peña, at the head of the bay, on a flat moorish tract not much elevated above the tide, I met with *Simethis bicolor* plentifully, *Pinguicula lusitanica*, *Cicendia filiformis* and *Illecebrum verticillatum*. One would prefer to find plants not known in England, but there is great pleasure in meeting with those we have formerly thought it a triumph to find in our own country.

Another interesting walk is towards the mouth of the harbour. There is a delightful footpath a little way from the edge of the low cliffs which form its shore, and though the mountains are the same as those we admired from Fuente del Mar and from La Peña di Castillo, they present themselves in new forms and with new combinations. One of the first objects in this direction is an *Iris*, growing in company with *I. fœtidissima*; it is perhaps *I. pumila*, but I saw no trace either of flowers or fruit. The two species of *Serapias* are abundant, and we have likewise *Ornithogalum narbonense* and *Allium fallax*. *Cynosurus echinatus* and

Briza maxima also invite our attention. Continuing my walk, I found in a cornfield *Cephalaria syriaca*. The almost sessile heads, and those on long stalks, on which DeCandolle founds two varieties, sometimes occur in the same plant; and he does not notice the very prolonged receptacle, which is a striking character. *Sedum Cepæa* also occurs in this walk, *Tolpis barbata*, *Picridium vulgare*, and *Adiantum Capillus Veneris*, which however I did not see.

The land forming the north side of the harbour of Santander terminates in a peninsula, and an island on which they are now building a lighthouse. The peninsula is composed of limestone rock, a large portion of which is covered by sand-hills. I expected to find here the plants which abound on the sand-hills at Biarritz, but the best are wanting. Those observed there which I have not already noticed were *Dianthus gallicus*, *Medicago striata*, *Herniaria glabra*, *Pulicaria odora*, *Linaria supina*, *Scrophularia canina*, *Veronica prostrata*, and *Sclerochloa Triticum*. Another set of sand-hills between this peninsula and the present lighthouse affords *Artemisia crithmifolia* and its parasite *Orobanche arenaria*, and *Allium sphærocephalum*. There is a large extent of sand-hills on the opposite side of the mouth of the harbour, which are heaped up to a considerable height above the limestone rock; they offer every step of the progress from loose blowing sand to a close covering of turf, but I found hardly anything which I had not previously noticed. There was one bush of *Cistus salvifolius*. I had expected to find Spain full of *Cistus*; but this plant, another at Las Caldas, and one or two others, all of the same species, at Bilbao, were all that I saw of the genus. *Juncus acutus* is very abundant on these sands, and I got *Arabis ciliata*, *Medicago marina*, *Ætheorhiza bullosa*, *Cynoglossum pictum*, *Plantago montana*, and in a moist spot *Lastræa Thelypteris*.

I have still a few gleanings of the country near Santander. On the shores of the Bay of Biscay I found *Linaria græca*. On the road towards Burgos, which sets off westward instead of eastward from Santander to get round the head of the harbour, there is a range of hills on a base of limestone: I visited it twice. They present a remarkable feature, which also prevails among those towards the lighthouse: it is the frequent occurrence of conical depressions or craters, which one might fancy to be volcanic, did the nature of the soil permit such a supposition. They are of different sizes, mostly filled up with trees or brushwood, and often ranging in lines, which seem to occupy the position of a continuous valley. The woods on these hills abound in *Arbutus*.

Pulicaria odora is pretty plentiful in one part; *Euphorbia dulcis* and *Thesium pratense* may be met with, and a *Daucus* just coming into flower, which perhaps may be different from *D. Carota.* I also observed an *Ophrys* with a short forward point like that of *O. arachnites*, but it was entire, rather favouring the idea that this is only a variety of *O. apifera*; but I did not see any plant of *O. aranifera*, and I am not disposed to believe it a hybrid.

On the 5th June I went up to a village called Las Corales, and on the 11th made a hasty trip to Reinosa. On the 21st I was again at Reinosa and went on to Pozazal. On the 25th I went to Alar, and on the 1st July returned to Santander. There is a railway now in progress from Santander to Alar, whence perhaps it may at some future period be continued to Valladolid and to Madrid. The part now completed occupies the summit level, at least as far as the road to Valladolid is concerned. It extends about thirty miles from Reinosa to Alar, and at Pozazal (pronounced Pothathal) the highest station attains an elevation of 3300 feet above the Bay of Biscay. Reinosa is forty-two miles from Santander, but it is expected that the railway for the greater part of this distance will be completed in the autumn of 1858. The remaining portion, which includes the most difficult part of the ascent, will require at least another year. The present journey to Reinosa is performed by diligences, passing through Torre la Vega, which will not be touched by the railway. Torre la Vega is situated in a beautiful valley well watered and well cultivated, with a mixture of trees, and surrounded by hills of varied forms, generally woody, sometimes rocky. It is seated in the valley of a little river called the Bisaya, the course of which we ascend through a narrow gorge to Las Caldas, a place, as its name implies, of hot springs. These rise just where the limestone rock makes its appearance, from under the beds of a hard sandstone. This limestone rises into mountains of considerable elevation, forming the northern boundary of the valley of Las Corales, in which the lower hills are mostly of a loamy soil, attributed to the greensand. Las Caldas would be a good botanical station for a few days, as these three soils would each contribute some peculiar plants, the best being probably in connexion with the limestone; but my stay there was very short: *Nasturtium pyrenaicum*, *Sedum dasyphyllum*, *Ligusticum pyrenæum*, *Eryngium Bourgati*, *Galium sylvaticum*, and *Valantia hispida* being my chief prizes, together with several species found in England on the chalk and on the mountain limestone.

I was three or four days at Las Corales—not, I think, a particularly good station for botany. Besides *Simethis*, *Teucrium pyrenaicum*, and some other plants before enumerated, I got *Lathræa clandestina*, *Anarrhinum bellidifolium*, *Lactuca tenerrima*, *Ononis mollis*, *Linum hirsutum*, *Orobus sylvaticus*, *Quercus pubescens*, *Sisymbrium austriacum*, var. *acutifolium*, and *Arenaria montana*, all of which would probably be found about Las Caldas.

Leaving Las Corales, we again ascend the course of the Bisaya through another gorge penetrating a very hard sandstone, which again opens into another valley, and from this a third and more magnificent gorge leads us to Reinosa. The proposed railroad is to pass through the two lower defiles; but the upper ascends too rapidly (1 in 17) for a railroad to follow it, and it will have to make a wide circuit. I observed a *Cacalia* and two or three other alpine or subalpine plants on some wet rocks in this upper gorge, probably brought down by the torrent, for we are far from having reached an elevation to account for their presence.

Reinosa is 3000 feet above the Bay of Biscay. The highest springs of the Bisaya are within two miles from it; but the town stands on the Ebro, whose nominal source is about five miles distant. I say nominal, because it appears to me that in this, and some other cases, a copious and permanent spring receives the honour of the name, while in fact the highest waters are several miles distant. The highest waters of the Ebro are, I apprehend, to be sought for in one of the snowy Sierras which we see from Santander, and probably in the highest of them, the Sierras Albas, though I am not sure that we see these from Reinosa. The most conspicuous of those we do see are the Sierras Sejos, which are real craggy mountains, retaining a good deal of snow at the beginning of July even on their southern faces. The hills immediately about Reinosa have rounded forms much like those of our Sussex chalk hills, but on a larger scale. Even these retained some patches of snow all through the month of June.

The general appearance of the vegetation at Reinosa is very different from that at Santander, and the climate is very different; very cold in the winter with immense quantities of snow, while the summer is hot from the unclouded sunshine. My first walk was to some low, but somewhat rocky, hills near the railway station. Here I gathered *Ophrys lutea*, *Scandix australis*, and a beautiful blue *Linum*, which, however, I found in much greater perfection in my walk the next day on the north side of Reinosa. It is, as well as I can make out, *Linum reflexum* of Hort. Kew.; though the reflexed lower leaves do not form a constant character.

The next day my walk was in the opposite direction, where I found, besides the *Linum* already mentioned, another species, which is probably a var. of *L. salsoloides*, though the open flowers are quite white, or with a faint tinge of yellow, while the buds are decidedly yellow. As the yellow-flowered *Linums* are usually considered to form a division of the genus, this rather puzzled me. These were on a small rocky knoll at the foot of the larger hills, and with them a variety of *Astragalus monspeliensis*, some of it with pink and some with yellowish flowers.

The meadows on the way to this knoll were filled with a handsome erect variety of *Campanula Rapunculus*, *Orobus albus*, and *Pedicularis comosa.* This *Orobus*, however, has the stipules fully as long as the common stalk; while in what I suppose to be *O. canescens*, which I met with afterwards, the common stalk is very short, hardly one-fourth of the length of the stipules. A little beyond these meadows, at the foot of the hills, grows *Vicia Onobrychoides*, a beautiful species. I may add to the plants of this place, *Alyssum campestre*, *Biscutella saxatilis*, *Erucastrum obtusangulum*, *Helianthemum polifolium* and *canum*, *Medicago suffruticosa*, and *Coronilla coronata.* *Carum bulbocastanum* is abundant in the corn.

On the 13th of June I went on the railroad as far as Pozazal, but an attack of illness prevented my researches and sent me immediately back to Reinosa, and afterwards to Santander, so that *Orchis pallens* and *Scorzonera humilis* were all I took back with me. On the 23rd I again went to Pozazal, and availed myself for a few days of the hospitality of Mr. Ross at the station. A rough hill gave me a *Scorzonera*, which I have not been able to determine. I saw afterwards a specimen of the same plant in the herbarium of M. Darracq at Bayonne under the name of *S. humifusa*, but that gentleman could not tell me where it was found or what was the authority for the name. It does not occur in Steudel nor in the 'Prodromus,' and is very badly applied to a plant with an upright, single-flowered scape. The description in the last-mentioned work of *S. crispa*, a plant of the Crimea, approaches more nearly to it than any other I have met with; but the neck of the root is not at all fibriferous, and among a great number of plants I saw no indication of a second flower. On this hill, which is on the side of the road opposite to the station, I also gathered *Dianthus pungens* and *Serratula humilis*. *Carduncellus mitissimus* is very abundant here and elsewhere. On the same side of the railroad as the station are some barren fields, cultivated, but apparently to little profit, divided by banks adorned with a few bushes—a sort of rudimentary hedge. Here I procured *Tragopogon crocifolius*, whose flowers, half yellow and half purple, were very conspicuous; *Achillea nobilis*, *Senecio Doronicum*, and *Thapsia villosa* just coming into flower; *Smyrnium perfoliatum*, *Arenaria grandiflora*, *Rapistrum rugosum*, *Hypericum hyssopifolium*, *Coronilla coronata*, *Vicia onobrychoides*, *Teucrium Polium*, *Stachys Heraclea*; another *Stachys*, whose name I have not determined, which resembles *S. recta* in habit, but is sufficiently distinguished by its numerous flowers (15 to 20 in a whorl), and by the floral leaves all exceeding the flowers; *Sideritis scordioides*, *Salvia Æthiopis*, *Cynoglossum cheirifolium*, *Aristolochia rotunda*, *Asphodelus ramosus*, *Allium roseum*, and *Echinaria capitata*. A variety of *Genista hispanica* with soft spines, *Prunus Mahaleb*, *Arenaria montana*, *Geranium sylvaticum*, *Trollius europæus*, *Ribes grossularia* with fruit hardly larger than a currant, *Crepis paludosa*, and *Pinguicula grandiflora*, grow on some hills a little farther to the south, where there is an ancient wood of oak and beech. Some of the trees are very large, but the best have been lately cut down for the use of the railroad.

There is a morning train from Reinosa at half-past six, reaching Pozazal at six minutes past seven, returning in the evening by that place at thirty-one minutes past eight, and arriving at Reinosa at nine. A botanist may therefore very conveniently fix his head-quarters at Reinosa to visit the neighbourhood of Pozazal, or even of the two following stations, where I did not stop, and where, as seen from the railroad, there is no very promising locality. The station for Aguilar is about two miles from the town; but this, with its picturesque castle and varied neighbourhood, would seem to be well worth a visit, perhaps a lengthened one, especially if the botanist should be tempted to visit some very bold snowy and craggy mountains visible from the railroad in that direction. I must observe that these notes on Spanish botany apply only to the plants of the lower country. I did not attempt to scale any mountain; but the Sierras Albas, which are visible from about Santander, always retaining a considerable body of snow, and those still more abrupt ones behind Aguilar, cannot but offer a number of interesting plants. Mountains said to be still more lofty occur farther west, in the Asturias.

About two miles from the station at Aguilar, on emerging from a very short tunnel, we find a village called Villa Escusa. Unfortunately the train does not stop there; but I was indebted to

Mr. Mould for the opportunity of visiting the hill above it called Congusto, a very curious eminence from the labyrinth of detached and fantastic limestone rocks which crown its summit, and particularly interesting to the botanist from the number of good plants which grow upon it :—

Alyssum montanum.
Sisymbrium —— ?
Arenaria tetraquetra.
Arenaria conimbrensis.
Linum salsoloides.
Linum salsoloides, yellow-flowered.
Linum reflexum ?
Rhamnus alpinus.
An *Umbellate*: undetermined.
Saxifraga —— ?
Hieracium —— ?
Serratula nudicaulis.
Centaurea —— ?
Thymus vulgaris.
Stachys —— ?
Coris monspeliensis.
Rumex bucephalophorus.
Euphorbia serrata.
Ophrys lutea.
Ophrys tenthredinifera.
Anthericum Liliago.
Trifolium, perhaps *cæspitosum*, but more woody than usual.

The *Sisymbrium* here mentioned is in many respects like *S. austriacum*, but it is a much smaller plant, 4 feet high instead of 2 feet, and the pod is longer in proportion and much more slender. The *Linums* are those I have already mentioned. The *Umbellate* was not far enough advanced to show the nature of the seeds. The root-leaves were simply pinnate, oblong in the outline; the leaflets sessile and almost as broad as long, incise, and the lower ones almost palmatinerved. The stalk spreads out into a broad sheath with a membranous margin. The stem-leaf pinnate, with few, linear-lanceolate leafits. Bracts one or two. Bracteoles about 5. Calyx obsolete. Flowers pinkish, not at all radiant.—The *Saxifrage* belongs to the division *Dactyloides* of Tausch, and to my division C. ii. *a*. M. Darracq pronounced it to be the *S. ladanifera* of Duby, *pedatifida*, Auct.; but that has the leaf deeply divided into three parts, and these again more or less subdivided: the plant of Congusto has thick fleshy leaves, not viscid when fresh, but exuding a gummy matter along the margin in drying. They end in 3 or 5 teeth without any deep separation; the barren shoots are not much lengthened, and the whole plant is rigid to the touch. The haft is not longer than the blade. Teeth of calyx very blunt. Quære if *S. capitata* ?

My next plant is a *Hieracium*, and I am almost tempted here to repeat the remark I made on *Orobanche*. This plant seems to belong to the *Villosæ*, or perhaps to the *Andryaloides*, for the hairs of the leaves and stem are feathery. As far as I have seen, it is one-flowered, very villous, with one or two very small leaves on the stem. Root-leaves broadly oval, attenuated sometimes rather abruptly into the haft, quite entire. I cannot find a place for it even in the multitudinous species of Grenier.

The *Centaurea* is stemless; the flowers yellow, two or three together on the crown of the root. Leaves pinnatifid. It resembles in habit *C. mixta*, a plant of Greece and of Asia Minor, but the outer and middle phyllaries terminate in a simple, somewhat dorsal spine without any accessory spines, and the appendage of the inner is narrow, terminating in 3 or 5 small prongs, instead of the broad papery membrane of *C. mixta.*

The *Stachys* is the same as that noticed at Pozazal.

Another hasty excursion took me from Pozazal to Alar. Before reaching the latter place we leave the limestone and all the supposed appendages of the greensand, and enter a country of gravelly hills. At first the boulders are large and often cemented into rock. As we advance, they are smaller, and with less solidity, and beyond Alar the hills gradually sink down into a sandy plain, which extends all the way to Palencia, and I believe to Valladolid. In the first part, however, these hills are varied and picturesque, though deficient in wood. They might be visited either on foot or on horseback from Villa Escusa or from Alar, where there is, for Spain, a very good inn. At Alar I gathered *Silene conica* and *S. conoidea.* The habit of these is sufficiently distinct to attract attention, and the much greater size of the seeds in *S. conoidea* affords a decisive character. *Helianthemum canum*, *Helianthemum hirtum*, *Helianthemum Tuberaria*, *Dorycnium fruticosum*, *Orobus canescens*, *Scorzonera hirsuta*, *Evax pygmæa*, *Micropus erectus*, *Convolvulus lineatus*, and *Thymus striatus*, Benth., *T. zygis* I believe of most authors.

The botany of the Pyrenees is too well known for me to think of adding to it, unable as I now am to scramble over mountains, and especially as each time I went up into their valleys I became ill. I may, however, make a few remarks for the use of those who, like myself, are not equal to prolonged exertion. At Pau, a few mountain plants are brought down by the Gave, and find a home on its wide bed of gravel. The valley at Eaux chaudes offers several interesting plants. There is a good carriage-road to Gabas, about six miles above Eaux chaudes. There you are at the foot of the Pic d'Ossau, and a mule-road passes thence into Spain, which, rising as all these Pyrenean passes do to a considerable elevation, must offer some alpine plants to the botanist. Near Bagnères de Bigorre rises the Pic de l'Hieris, a mountain covered with pine-forests, and celebrated for its botany; which however, though mountainous, is not alpine. A few miles from Bagnères de Luchon is the Val d'Esquierri, also famous for its botany. After passing the little village of Oo, you ascend a shivery bank on the right, the upper part of which is craggy and woody; but the rocks are not firm, and on horseback the ascent is rather a nervous affair. Above this you enter a grassy valley with a rich variety of plants, rather however subalpine than alpine; but the slopes which bound it on each side ascend to patches of snow. I met two botanists as I descended, who were prepared to pass a night on the mountain—the only way of examining thoroughly its productions. The Port de Venasque is also visited from Bagnères de Luchon; but I apprehend the best station for examining this neighbourhood would be the Spanish town of Venasque, where there is, I am told, a very tolerable inn, much better than the Hospice on the French side, and where you are immediately at the foot of the mighty Maladetta.

We returned by Cette and Arles, taking advantage of the railway from Toulouse. At both these places there is a good warm-country botany, and of a very different character in each place; Cette presenting limestone rock and the sands of the sea-shore, while about Arles all is gravel. The uncultivated lands about Nismes will also gratify the botanist with several interesting plants delighting in a limestone soil; and various points above Arles and about Orange, and some other places among the gravelly hills which there bound the immediate valley of the Rhone, will afford him abundant opportunity of examining the productions of that soil. The railroads now make all these places easily accessible.

If any botanist should be disposed to follow me in a visit to the N. of Spain, the foregoing observations may perhaps help him to direct his steps. The Pyrenees are so well explored, that there is no hope of making new discoveries among them, unless indeed they be founded on those nice and almost intangible distinctions which seem now to be in favour with many of the French botanists. With the range of high land which forms a continuation of the Pyrenees along the north coast of Spain, the case is far different. Their productions are comparatively little known; and though neither so high nor so abrupt as that part of the chain which separates France from Spain, yet, as in the Asturias the mountains rise to the height of 10,000 feet, and in many other places to seven or eight thousand, they must offer great varieties of soil and situation. An accomplished Italian botanist is said to be about to publish a flora of the whole range, from Rosas on the Mediterranean to Cape Finisterra; but one man cannot exhaust so extensive a subject, and the book when published would be a useful guide for future explorers. If an English botanist should then be disposed to visit the North of Spain in 1859, he will probably find the steamers either from Liverpool or from Southampton on a better footing than they are at present, and there would doubtless be some improvement in those from Bayonne. At Santander such a traveller would stay two or perhaps three days, visiting the Peña di Castillo, the sands at the mouth of the harbour, those towards the lighthouse, and the shore of the Bay of Biscay for two or three miles west of the lighthouse. The railway would then take him to Las Caldas: I doubt if he would find it worth while to stop before reaching that place, as he is likely to find little which would not be obtained either at Santander or at Las Caldas. At Las Caldas he would have employment for three days at least on the sandstone of the gorge, on the limestone to the east, and on the loamy wooded hills to the west of the station. An interesting walk from Las Caldas would be across the plain of Las Corales to Somhoz, where crossing the river and turning to the left he will have another pleasant walk over some eminences partially covered with wood. Thence he may descend into a rocky valley nearly parallel to the Bisaya, and again keeping to the left return by the right side of the river, and explore the singular bank which divides the basin of Las Corales into two parts, one 20 or 30 feet higher than the other. A third and most magnificent gorge leads to Reinosa, and this gorge would be worth a day's examination. Above this, I believe I can add nothing to what I have already said as to localities. Reinosa might be the head-quarters for visiting three mountain masses: the Sierras Albas, the Sierra Sejo, and a third range to the east of the road, whose name I forget, but which, though perhaps not so high as the others, is yet sufficiently elevated to preserve some snow in its hollows throughout the year.

Note on the Genus *Hemigymnia*, Griffith. By THOMAS THOMSON, Esq., M.D., F.R.S., F.L.S., Superintendent of the Calcutta Botanic Garden.

[Read February 18, 1858.]

BOTANISTS will be glad to learn that a valuable contribution to our knowledge of the little-known flora of Malwah in Central India has recently been made by the labours of Lieut. Beddome, of the 42nd Regiment M. N. I., who has resided more than a year in the province, and has communicated to me many interesting specimens, as well as a catalogue of the plants of the vicinity of Jubbulpore, for publication in the 'Journal of the Asiatic Society of Bengal.'

In a notice of some plants of this little-known province, collected by Mr. M'Leod, Griffith* published a new genus of *Verbenaceæ*, under the name of *Hemigymnia*, which he considered nearly allied to *Tectona*, but readily distinguishable by the included stamina, the styles twice bifid, as in *Cordia*, and the fruit supported by the persistent calyx, which does not enclose the fruit as in *Tectona*.

As the original specimens of the plant on which the genus *Hemigymnia* was founded have not been seen by any botanist but Griffith, the brief description contained in that author's paper, and repeated in DeCandolle's 'Prodromus,' vol. xi. p. 697, is all that is known on the subject. These specimens, which were perhaps very imperfect, are probably still in the India House, where Griffith's original collection is believed to exist.

Among other interesting plants, Lieut. Beddome has sent excellent specimens of a tree which he considers to be Griffith's *Hemigymnia*. In this I have no doubt he is correct, for, except in one point, it agrees very closely with the description; and its native name *Deyngan*, though not identical with that assigned by Mr. M'Leod to *Hemigymnia* (*Dahman* or *Dahyan*), is so similar, that in all probability both are intended to represent the same sound.

Griffith's description having been transferred by Schauer with only some verbal alterations to DeCandolle's 'Prodromus,' it is not necessary to repeat it here. Lieut. Beddome's plant has an infundibuliform, striated, five-toothed calyx. The tube of the corolla is cylindric rather than infundibuliform; but the limb has five narrow oblong segments, nearly twice as long as the tube. There are five stamens alternate with the lobes of the corolla, and a four-celled ovary with one solitary ascending ovule in each cell. The style is twice bifid; and the fruit, still immature, is rostrato-cuspidate and "calyce cupuliformi semicinctus."

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* M'Clelland's Journal, iii. 361.

Lieut. Beddome's plant, however, differs from Griffith's description in its alternate (not opposite) leaves, and is an undoubted species of the genus *Cordia*, as now generally understood. Still, the agreement of every other character is so complete, that I cannot but think that Griffith has been misled by imperfect specimens to regard the subopposite arrangement of the leaves, so commonly seen close to the cymose inflorescence of many species of *Cordia*, as a constant character; and I feel equally certain that the supposed opposition of the leaves, and a certain general resemblance in foliage to *Gmelina*, and in flowers to *Tectona*, further led him to consider this plant Verbenaceous, notwithstanding the striking character of the division of the styles, to which he nevertheless directs attention as indicating an affinity with *Cordia*.

Turning to the described species of *Cordia*, I find a plant described by Wallich (Roxb. Fl. Ind. ed. Carey & Wall. ii. 329; Wall. Cat. 897; *C. Wallichii*, Don, Syst.; D.C. Prod. ix. 479) under the name of *C. tomentosa*, with which Mr. Beddome's plant should be compared, not only on account of a general agreement in the brief character assigned to it, but because it was described by Wallich from Heyne's collection, and may therefore not improbably have been obtained from the province of Malwah. As no specimens of Wallich's *C. tomentosa* exist in India, I have sent a small specimen of Mr. Beddome's plant to Dr. Hooker, with a request that he should compare it with the Wallichian herbarium and append the result to this note.

Should my conjecture prove unfounded, there are two other species of *Cordia* with which I think our *Cordia* will prove allied, and with which it should be compared, before it can be considered as new. These are, *C. ovalis*, R. Br., ? D.C. Prod. ix. 479, and *C. amplifolia*, Alph. D.C. Prod. ix. 481. This last is said to produce a valuable timber, agreeing in this point with the Jubbulpore plant.

There can be little doubt but that all these plants are closely allied; and the African origin of the last two affords an additional proof of the curious resemblance of the flora of Western India to that of Eastern Africa, as has already been pointed out in the 'Flora Indica' (Intr. p. 113), and which is strengthened by every addition to our knowledge of the botany of the province of Malwah especially.

Note by Dr. J. D. Hooker.

Lieutenant Beddome's plant (Griffith's *Hemigymnia*) is undoubtedly a species of *Cordia*, as Dr. Thomson conjectures, and allied to the *C. abyssinica*, Br. (*Varronia abyssinica*, D.C.), differing, however, from that plant in the pubescent upper surface and dense white woolly tomentum of the under surface of the leaves, which extends over the petioles, ramuli, peduncles, and calyces; its corolla is also much smaller. On the other hand, *C. amplifolia*, A. D.C., and *C. Wallichii*, Don, are both closely allied to *C. myxa*, and have terete, not grooved calyces. Of *C. ovalis*, R. Br., too little is known to speak decidedly. I have found imperfect specimens of the same species in Dr. Stocks' collections, but without any habitat; and others, also without a habitat, have been received from Dr. Gibson, in both cases probably from Central India. I may add, that I find in Dr. Thomson's Kumaon collections fruiting specimens of another anomalous Cordiaceous plant, *Gynaion vestitum*, A. D.C. (in D.C. Prodr. ix. 468), gathered at the same spot as those by Edgeworth, and originally described by A. D.C. It is, as A. DeCandolle himself suspects, a *Cordia* allied to *C. Griffithii* and *C. abyssinica*. I append diagnoses of both.

CORDIA M'LEODII (*Hf. & T.*). Arborea, ramis robustis, ramulis foliis subtus inflorescentiaque dense fulvo-tomentosis, foliis late ovatis ovato-cordatisve obtusis margine subsinuato undulatis coriaceis supra pubescentibus, floribus corymbosis, calyce tubuloso sulcato 5-fido, corollæ lobis parvis angustis.

Hemigymnia M'Leodii, Griff. in Calc. Journ. Nat. Hist. 1843, iii. 363; Schauer in D.C. Prodr. xi. 697.

Hab. In India centrali; Malwah! *Griffith*, *Beddome*. Concan? *Gibson*, *Stocks*.

CORDIA VESTITA (*Hf. & T.*). Ramis robustis, ramulis foliis novellis et inflorescentia dense sericeo-lanatis, foliis late ovatis elliptico-ovatisve acuminatis coriaceis supra scaberulis subtus pubescenti-tomentosis subsinuatis villosiusculisve, floribus polygamis cymoso-paniculatis, calyce sulcato 4–6-lobo lobis patentibus.

Gynaion vestitum, A. D.C. Prodr. ix. 468.

Hab. In Himalaya occidentali tropica; Garwhal ad Pau, alt. 3000–4000 ped.! *Edgeworth*; *T. Thomson*.

Note on some Suprasoriferous Ferns.

By Thomas Moore, Esq., F.L.S.

[Read May 5th, 1857.]

The normal condition of the majority of the Ferns, as is well known, is to produce what is called their fructification, on the under surface or the back of their fronds, and hence they are called dorsiferous. There are, however, some remarkable deviations from this rule among the Ferns which belong to the dorsiferous class.

Some time since, in the "*Nature-Printed Ferns of Great Britain and Ireland*," I had occasion to mention the fact, that certain varieties of the common Hart's-tongue Fern (*Scolopendrium vulgare*), habitually produce sori on the upper as well as the under surface of their fronds. This occurs, for the most part, on those varieties, several in number, in which the margin is crenately lobed. In these cases, it often appears as if the normally-placed sori had been continued so as to reach the margin at the acute sinuses of the lobes, and then returned on the opposite surface; but it also frequently happens that the abnormally-placed sori are distinctly within the margin, and borne where there are no corresponding sori beneath.

Subsequently another example of this kind has been recorded by Sir W. Hooker*;—an aspidioid suprasoriferous *Polypodium* found in Ceylon. I have now to mention a still more remarkable instance, occurring in a totally different group of ferns, in which the fructification is normally marginal.

Some time ago I was favoured by my friend Mr. C. Moore, the Director of the Botanic Garden at Sydney, with some fronds, cultivated in the Sydney garden, of one of the Ferns he had obtained from New Caledonia. This fern, named after him *Deparia Moorii* by Sir W. Hooker†, I have already, under the name of *Cionidium*‡, brought under the notice of the Society as forming a Deparioid genus, with reticulated veins. *Deparia* normally bears its spore-cases within little cup-like involucres, standing out from the extreme margin of the fronds on little footstalks, and the same kind of structure occurs in *Cionidium*. In the specimens of *Cionidium Moorii*, above referred to, these normally-placed marginal exserted sori were abundant; but in addition to them were other perfect sori scattered here and there, both on the upper and under surface, entirely removed from the margin, sometimes even almost close to the midrib, and considerably more numerous on the upper than on the under surface. These surface-sori, in all the instances examined, proved to be furnished with the usual involucre beneath the spore-cases, but were apparently without any pedicel (the latter being, however, very short in the marginal sori of this plant), so that they were similar in character to those of *Woodsia* and *Hypoderris*, or as to position to those of the true (net-veined) *Aspidiums*, being placed directly on the network of veins.

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* Kew Journal of Botany, viii. 360, t. 11.

† *Ibid.* iv. 55, t. 3.

‡ Proceedings of the Linnean Society, ii. 212.

The inferences which may, I think, be drawn from these instances of anomalous structure, are, (1) that the veins are important structures in the economy of fern development, since they thus appear capable of originating the receptacle and spore-cases from their surface in any part—even in unusual parts—of the frond; and (2) that sufficient importance seems thus to attach to them, to justify their employment for the purpose of assisting in the definition of genera, in a family of plants where something more than the so-called fructification itself is confessedly needed to supply distinctive characters.

Description of a remarkable spike or bunch of Fruits of the Fig Banana (*Musa sapientum*), *var*. By Sir ROBERT H. SCHOMBURGK. Communicated by GEORGE BENTHAM, Esq., F.L.S.

[Read June 2nd, 1857.]

A VARIETY of the Banana is called here (that is to say in the Island of Saint Domingo) Guineo, and known in some of the English West India Islands as the Fig Banana. There is no outward mark of difference between a common Banana tree and that of the Guineo: the fruit of the latter is, however, much smaller, rounder, somewhat pointed on the opposite end, not unlike a fig, and of a much sweeter and far more delicious taste than the large Banana, resembling not only in odour, but likewise in taste, our apples, from which circumstance it has been called Guineo-Manzana or Apple Guineo, to distinguish it from the Martinica-Manzana or Martinique Apple Banana. The latter are the fruits of the so-called Chinese Dwarf Plantain (*Musa chinensis* of *Sweet*, which Paxton has re-christened *Musa Cavendishii*). This species was introduced into Santo Domingo from Martinique. The stem seldom reaches a height beyond 8 feet, and the racemes or branches of fruits are of such a size, that they touch the ground, containing from three to four hundred fruits, resembling a plantain in miniature by their being not so round, and somewhat angular, like the common plantain.

A few days ago, His Excellency Señor Buenaventura Baez, the President of the Dominican Republic, aware of the interest which I take in all that refers to Natural History, sent me a bunch of the kind of Bananas called Guineos, which differed in a very remarkable manner from any I had ever seen before; nor have I as yet found any person in Saint Domingo who had previously seen anything similar.

In the usual mode of inflorescence of the Plantain and Banana, the fertile flowers are produced in successive rows, and these having ceased, are succeeded to the end of the stem by barren flowers, none of which produce a fruit. Some botanists have therefore considered the genus Musa as unisexual by abortion.

The accompanying drawing of the bunch of Bananas which I received from his Excellency the President, shows a most remarkable deviation from the general rule. The upper part of the raceme, nearest to the stem, consists of eight rows of the Fig-Banana, numbering 125 full-grown fruits of that kind. After the eighth row, follow seven series of barren flowers, when, contrary to the usual mode, a new series of fertile flowers springs up, consisting of thirteen rows, which have produced 420 fruits, smaller in size than those of the upper part of the raceme, and resembling the Martinica Manzana, or fruits of the *Musa chinensis*, only that they are much smaller than the fruits of that description in their natural state.

We have here the singular circumstance of the production of two kinds of fruits, of the same genus it is true, but hitherto considered specifically different, on the same spike, although the plants of both are individually different in growth, and the fruits different with regard to appearance and maturity. The upper parcel of Fig-Bananas were all in full maturity, and commenced to fall off from the stem (as is the case when the Banana has reached its full ripeness), on the 11th of October, while the lower parcel of fruits began only six days later to assume a yellow colour.

The appearance of two different kinds of fruits on one and the same stem, reminded me of a somewhat analogous case in a family not many links removed from the *Musaceæ*, namely, the production, on the same spike, of flowers of *Monacanthus*, *Myanthus*, and *Catasetum*, formerly supposed to be different genera belonging to the family of the *Orchidaceæ*; my account of which is published in the "Linnean Transactions," vol. xvii. p. 551.

I have to regret that I did not see the raceme of the Banana, now under consideration, when it was in flower, or at any early state of its growth; for, although it was produced in a garden within the city, I knew nothing of it, until it was sent to me by President Baez; but as the flowers of Plantains and Bananas, including all the different varieties of the latter, are so much alike, even a botanist might have passed the tree without his attention being attracted; and this remarkable play of nature would only become observable when the lower series of flowers commenced to form themselves into fruits.

It affords, however, an additional instance in favour of the opinion which I have already expressed (when giving an account in the "Linnean Transactions" of the production of flowers on the same spikes of three different presumed genera of the order *Orchidaceæ*), that with regard to genera and species, we must prepare ourselves for remarkable discoveries.

Plants under cultivation are much more subjected to such freaks of nature, than when growing in their own soil and climate, left to themselves. I know, from my own experience in Saint Domingo, how little reliance can be placed upon the colours of fancy flowers, such as roses, dahlias, pinks, asters, &c.: even in cases where the mother-plant from which came the cuttings (in the case of roses or pinks), the roots (in the case of dahlias), or seeds (in the case of asters, &c.), were double, single flowers have succeeded. For example, cuttings from roses of the China-stock will, notwithstanding their having produced one year flowers of the variety of which they bear the name, revert perhaps the next year or later to the Chinese rose of old standing; and with regard to dahlias, they have produced single and double flowers of different colours on the same plant in my little garden. The latter happened in a very remarkable degree in a dahlia called "the Butterfly," which the second year produced double and single flowers on the same plant; here white, the leaves edged with maroon; there of a uniform deep maroon colour.

On Four Varieties of British Plants.

By John Hogg, Esq., M.A., F.R.S., F.L.S., &c.

[Read Nov. 19th, 1857.]

I beg to present to the Linnean Society four or five varieties of British plants, which were collected by myself during the last summer.

The first is a white-flowered variety of the common scarlet Corn Poppy (*Papaver rhœas*, var. *flore albo*). I gathered a single plant in a potato-field, at some distance from the village of Norton, in the county of Durham, on September 18th. The petals, when fresh, were of a beautifully delicate white colour, having a small dark-red spot at their base. I only once before met with the like variety, which was also near Norton, more than twenty years ago; and which is recorded in the late Mr. Winch's 'Flora of Durham and Northumberland.' As far as I can find, no notice is taken of this variety, as a wild plant, in any other Flora of British plants.

The second is, the European Strawberry-tree, or *Arbutus unedo*, of which the varieties here presented are Irish specimens. After a search among our English and Irish works on native plants, I was surprised not to find any mention of these very distinct variations in the form and breadth of the leaves. The one, which I term var. *latifolia*, is a truly noble tree, its leaves much resembling those of the bay-tree, or *Laurus nobilis*, but with their tips often rounded. It is also very robust in its habit, and attains a large size. It was growing in the fissures of the compact grey limestone on the margin of the Tore Lake, or as it is otherwise named, the Middle Lake, at Killarney. The second, which I call var. *angustifolia*, I gathered from a small tree deeply rooted in the crevices of the same limestone rock, on the shore of the lower lake, on the same day, Aug. 21st last. This variety possibly agrees with the var. 7, *salicifolia*, 'willow-leaved,' of the London nurserymen, as mentioned at p. 1118 of Loudon's 'Arboretum et Fruticetum Britannicum,' vol. ii. edit. 2. I will not here enter on the disputed question of the indigenousness of this beautiful tree, now so abundant about Killarney; but I will only observe against the affirmative side, that none of the Arbutus wood has ever, so far as I could learn from many inquiries in the island, been dug up with the other common sorts of bog-wood, among the peat or bogs of the south-west of Ireland.

In the town of Killarney there exists a considerable manufacture of work-boxes, writing-desks, tables, tea-caddies, cardcases, and other fancy articles of varied and beautiful design, made with thin slices of the *Arbutus-wood*, veneered with skill. Numbers of the poorer class thereby gain a very good livelihood.

The third plant is perhaps only a remarkably large and luxuriant variety of *Astragalus hypoglottis*; or, indeed, it may ultimately be proved from its mature pods to be a distinct and foreign species. I first discovered three or four individuals of it in the summer of 1856, which were growing on the side of the West Hartlepool railway, near the Greatham viaduct in the county of Durham; but the dried specimens which I now exhibit, were gathered in July last, from one of the plants seen by me last year. For the better comparison of the ordinary form of *A. hypoglottis* with this abnormal one, I have attached also a dried and very old specimen of the true "Purple Mountain Milk-Vetch," which was gathered near the Queen's Ferry, Edinburgh.

Smith, in his 'English Flora,' vol. iii. p. 295, gives the entire length of the stem of the normal plant in Britain, as varying from "2–5 inches," and its leaflets are usually "small and ovate"; or rather, as Sir W. Hooker states, "elliptico-ovate." Withering also, in his 4th edition, vol. iii. p. 269, describes the number of leaflets in each leaf as from "six to twelve pairs with an odd one," terminating the leaf; and Mr. Babington says the leaflets are "in eight to ten pairs." Now, in my recent and larger specimens, the stems varied from about 12 to 14 inches in length, the entire stem being stronger but more straggling; the leaves containing fourteen or sixteen pairs of leaflets and a terminal one: the leaflets themselves are less ovate, and more elongated or lanceolate. The flowering stems are nearly double the length of those of the ordinary plant; the flowers are more numerous, and the flower-heads are larger and stouter. Indeed, the whole plant is altogether more robust and upright; and if a variety of *A. hypoglottis*, it presents a very luxuriant condition. At first I was inclined to think that it might be a foreign species (and from further examination of it I retain the same inclination) introduced with ballast, as it was found on the side of a railway only a few miles distant from a considerable seaport, West Hartlepool; and the ballast or ground in which it was growing was a mixture of sand and sea-shells much broken. But had it been growing in a very rich soil, this might have accounted for its remarkable luxuriance of size, and might have induced one to suggest that it might be cultivated, like tares or saintfoin, as food for cattle, with every prospect of success.

I have very recently, with the kind assistance of Mr. Kippist, looked over the species of *Astragalus*, which are preserved in the Linnean and Smithian Herbaria. In Linnæus's collection I did not see any foreign plant at all resembling it; but in Smith's own Herbarium, in the sheet of paper containing many dried specimens of *A. hypoglottis*, the variety marked No. 6 approaches my plant in the form of its leaflets, though not in the number of their pairs. This variety is an Asiatic one, being underwritten "Caucasus," communicated doubtless by Fischer. It is evidently a mere variety of our English *A. hypoglottis*, and retains its chief characters, the leaves excepted.

I next examined the plates in DeCandolle's beautiful 'Astragalogia,' and observed in his engraving (Tab. 12) of *Astragalus purpureus*, a very considerable resemblance to my plant in its length of stem, its somewhat straggling character, and its general appearance; although its head of flowers is not represented so large, or its leaflets sufficiently long. It is a native of the South of France, chiefly growing in the mountains of Provence.

I will now briefly add DeCandolle's distinctions between *A. hypoglottis* and *A. purpureus*. In his later work, the 'Prodromus Syst. Naturalis,' tom. ii. p. 281, he describes, No. 1, *A. hypoglottis*, ... as "piloso-subvillosus".... "foliolis obovatis oblongis, sæpe emarginatis 8–10 jugis;" and its pod with one seed in each cell or division; whilst No. 3, *A. purpureus*, he details as being "subvillosus".... "foliolis obovatis apice bidentatis," and its pod as having in each division three seeds. Hence the chief differences, besides the seeds, between *A. hypoglottis* and *A. purpureus*, so pointed out, are the less hairiness of the latter plant, and the leaflets furnished at their tips with two small teeth: and, since the leaflets are more fully described in the 'Astragalogia,' I will here give the passages relating to them :—

"*A. hypoglottis.*—. . . . foliola 19–29, opposita, ovata aut ovato-oblonga, 3–8 millim. longa, obtusa aut sæpe in eadem planta apice emarginata, subtus incano-villosa; superne glabra aut pilis quibusdam onusta." (p. 118.)

"*A. purpureus.*—. . . . foliola 23–29 opposita, ovato-oblonga, apice emarginata, vel potius bidentata et in sinu brevissime mucronata, pubescentia, aut villosa, 7–9 millim. longa." (p. 117.)

In the number of pairs of leaflets in the former plant there seems to be some error, for DeCandolle makes them 9–14, with an odd one, whereas in our English plant the pairs are only 6–12 at most, with an odd one; and in the 'Prodromus,' the author writes 8–10 pairs. In my variety the pairs are 14–16, with an odd one; whilst the bidentations on their tips, in any of them, are scarcely, if at all, perceptible. This, however, is a character likely to be variable in itself, and to assume in some specimens the appearance of mere emargination.

In addition to the greater length of the leaflets in my new plant, their under-sides are less hoary and villous than those of the *hypoglottis*. But I must remark, that the chief and best distinction between these two species is, if constant, the solitary seed in each cell of the bilocular pod of the *A. hypoglottis*, and the three seeds in each of that of the *A. purpureus*.

In examining, a day or two ago, with Mr. Kippist, under a lens and small microscope, an immature pod taken from the lowest flower from one of the heads of each variety or species, eight or nine ovules were plainly visible in each dissected pod; consequently, if the character be a good one, all the ovules except two,—that is, one in each cell in the pod of *A. hypoglottis*, and all, save six, in the pod of the new plant, if *A. purpureus*,—must, in ripening, continue immature or abortive. So I must wait until next summer to decide the accuracy of this distinction, when I hope to procure some mature pods from my variety, or new species. But I shall have no difficulty in obtaining the pods of *A. hypoglottis*, as this pretty plant is common on the sand-links near Hartlepool and Seaton.

Looking then to the more elongated form of the immature pod of my new specimens, and compared with the subcordiform and compressed shape of that of *A. hypoglottis*,—see fig. (*a*) of Plate 12, and figs. (*a*) and (*b*) of Plate 14, in the 'Astragalogia,' and which distinctions are apparent in the dissected young pods contained in papers B 3 and B 4;—I am more inclined to affirm that my recent plant is rather to be accounted as a variety of *A. purpureus*, without the bidentate tips of the leaflets,—the seeds having, most likely, been imported with ballast from Toulon or Marseilles to Hartlepool,—than as a variety of *A. hypoglottis*. And this opinion seems to be in some degree confirmed by the greater number of flowers in each larger head, the much longer peduncles, the greater number of pairs of leaflets, their more lanceolate form, their less hoariness and villousness, than those which respectively occur in *A. hypoglottis**.

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* After my paper was read, a gentleman present at the meeting stated that Baxter had figured, in his 'British Phænogamous Botany,' a variety of the *Plantago major*, which he thought was the same as mine. On looking, subsequently, at vol. iii. plate 207, I found that he has figured at No. 7, a small

The fourth and last plant I now submit to notice, is a most curious departure from the ordinary or normal form of *Plantago major.* I discovered three plants of it nearly together on July 13th of this year, in a meadow, at Norton, in the county of Durham. On examination, each single flower will be found to have grown into a separate spike of a close pyramidal form, and the entire flowering panicle or head to have put on a most distinct and compact pyramidal character; so the variety may be distinguished as—*pyramidalis*—paniculis pyramidalibus densis. Smith, in his 'English Flora,' vol. i. p. 214, says, "the rose-shaped variety, and the panicled one, are often kept in gardens for the sake of curiosity, and afford remarkable instances of vegetable transformation." He mentions two varieties:—"γ. *P. major*, panicula sparsa," figured in Bauhin, Hist. iii. p. 2. 503, *f.*; "δ. *P. rosea*," ibid.

On referring however to Bauhin's work, as alluded to by Smith, the woodcuts there given do not resemble my variety, which is by no means rose-shaped. In the accompanying paper (D.) I have dried two flowering heads of the usual form of the *Plantago major*, which were growing near this varied plant, in order that this curious yet very beautiful transformation may be the more distinctly apparent. The rest of the plant does not differ from the common growth of *P. major*.

Botanical Report on the North-Australian Expedition, under the command of A. C. Gregory, Esq. By Dr. FERDINAND MÜLLER, Botanist to the Expedition. Communicated by the Colonial Office.

[Read Dec. 17th, 1857.]

Sydney Botanic Garden, 20th May, 1857.

SIR,—I do myself the honour of transmitting to you a brief general report on my botanical researches, instituted during your exploration of intertropical Australia.

In order to elucidate how far I was justified to advance the general conclusions contained in the following pages, I beg to refer introductorily both to the extent and the directions of your tracks of exploration, along which I endeavoured to ascertain, not

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head of the *Plantago major*, very like my transformed plant; but it seems less, and not so pyramidal in its entire form. Mr. Baxter describes it as var. η, and says it was discovered near Oxford, July 26, 1835.

only the nature of the vegetation, but also the range of its species. I beg further to observe, that I include in the following remarks all those plants which, during momentary interruptions of the voyage to the Victoria River, we were enabled to collect on the islands on the N.E. coast, as well as those obtained during our stay at Moreton Bay.

The plants thus accumulated illustrate, I think, almost completely the flora of Arnhem's Land, with the exception of the northern part, where it seems bamboo-groves and many other features of the Indian vegetation exclusively exist. They comprise further a nearly perfect flora of the Victoria River and its vicinity, as also of the dividing table-land or ranges between North Australia and the interior, less completely the vegetation of the north-western interior (as far as long. 20° 18′ south, and lat. 127° 30′ east), which may be considered as part of the flora of Central Australia. The collections formed during the last part of the expedition illustrate to a considerable extent the vegetation of the country around the south-west, south, and south-east part of the Gulf of Carpentaria, more or less remote from the coast, and finally the plants of the eastern tropical and subtropical parts of New Holland. My observations extend consequently from Point Pearce (the most northern place visited on the mainland in lat. 14° 30′ south) to Termination Lake (our last position south-west, in lat. 20° 18′ south, and long. 127° 30′ east), and north-east as far as the lower part of the Gilbert River (in lat. 17° 15′ south, and long. 141° 20′ east) and south-east as far as Moreton Bay (lat. 27° 30′, long. 153° 20′ east). Additions to the plants from these tracts of country form those procured on the islands of North-east Australia (from lat. 15° to 10° 45′ south); and although the collections from these localities are very limited in land plants, they are of some value, as throwing light upon the phycology of that part of the globe.

In arriving at the conclusions advanced in the following pages, I availed myself of R. Brown's general remarks, appended to 'Flinders's Voyage,' and to Sturt's work on 'Central Australia;' of Allan Cunningham's appendix to King's 'Intertropical Survey of Australia;' of the botanical notes scattered through Sir Thomas Mitchell's work on 'Tropical Australia,' and through Leichhardt's 'Overland-Expedition;' and of Carron's 'Narrative of Kennedy's Expedition.' Besides these works, Mr. Brown's and DeCandolle's 'Prodromi' are almost the only important sources of information on the flora of the intratropical zone of this country.

In the absence of a general work of a recent date on those plants constituting the polypetalous orders, we are, at least as regards Australia, but scantily acquainted with this section of the vegetable kingdom ; and if, therefore, many plants noticed during the expedition are on this occasion pronounced as additional to the Australian flora, it is to be admitted, that some of them in all probability occur already in the collections of Allan Cunningham, of R. Brown, or even of Banks and Solander, still unrevealed to botanical science.

The number of plants observed in the whole extent of our journey amounts to nearly 2000 species, which exhibit the proportionately great number of 160 natural orders, and more than 800 genera. Monocotyledoneæ bear to Dicotyledonous plants scarcely the proportion of 1 : 4, and Acotyledoneæ (exclusive of minute fungi) 1 : 8, but with the omission of Algæ only 1 : 12. In North, North-western, and Central Australia cryptogamic plants diminish in number with the decrease of atmospherical humidity to such an extent, that their relative proportions to the rest of the vegetation is probably much smaller than in any other part of the globe, mosses and lichens being almost entirely excluded from many extensive tracts of the country.

The richest natural orders of plants observed in tropical Australia may be arranged according to the preponderance of species in the following series: viz. *Leguminosæ*, *Myrtaceæ*, *Compositæ*, *Cyperoideæ*, *Algæ*, *Euphorbiaceæ*, *Rubiaceæ*, *Filices*, *Proteaceæ*, *Malvaceæ*, *Goodeniaceæ*, *Solanaceæ*, *Convolvulaceæ*, *Sapindaceæ*, *Scrophularinæ*, &c. But this series, applying to the accumulation of plants from all the country traversed, has to receive considerable alteration in adapting it exclusively to the north-west portion of the continent, where *Compositæ*, *Euphorbiaceæ*, *Rubiaceæ*, and *Filices* exist only in a much diminished proportion.

The expedition has not disclosed a single new fundamental form of the vegetable kingdom in the type of a new natural order, unless such should be exhibited yet by any of those, which were seen in a state too imperfect for accurate classification, and were consequently excluded from the appended systematical list. But *Hippocrateæ*, *Alangiaceæ*, *Hydrophylleæ*, *Ephedreæ*, and *Pontederiaceæ* are now for the first time introduced into the Australian flora. The genera, richest of all, are to be arrayed according to their predominance in the following succession :—*Acacia*, *Eucalyptus*, *Solanum*, *Panicum*, *Fimbristylis*, *Grevillea*, *Goodenia*, *Hibiscus*, *Ipomœa*, *Stylidium*, *Mitrasacme*, *Andropogon*, *Cyperus*, *Sida*, *Crotalaria*, *Indigofera*, *Loranthus*, *Ficus*, &c.

Of natural orders, more or less extensively represented in the extratropical parallels of Australia, none were noticed of the following beyond the tropic of Capricorn in a complex of lines of exploration exceeding 5000 miles, and in an extent of 22° of longitude and 9° of latitude; viz. *Ranunculaceæ*, *Hydropeltideæ*, *Tremandreæ*, *Geraniaceæ*, *Rosaceæ*, *Callitrichineæ*, *Crassulaceæ*, *Cunoniaceæ*, *Mesembryanthemeæ*, *Caprifoliaceæ*, *Epacrideæ*, *Plantagineæ*, *Irideæ*, and *Hypoxideæ*. Besides these, none of the following were noted in North or North-western Australia, viz. *Anonaceæ*, *Aurantiaceæ*, *Hippocrateæ*, *Erythroxyleæ*, *Xanthoxyleæ*, *Cedreleæ*, *Alangiaceæ*, *Escallonieæ*, *Araliaceæ*, *Oleineæ*, *Piperaceæ* and *Aphyllanthaceæ*: and these are foreign to North-western Australia in addition to the former:—*Cruciferæ*, *Guttiferæ*, *Oxalideæ*, *Passifloreæ*, *Primulaceæ*, *Scitamineæ*, *Junceæ*, *Restiaceæ* and *Xerotideæ*.

Amongst the plants remarkable for their geographical distribution, the Gouty-stem tree (*Adansonia Gregorii*) is deserving of particular notice, since this expedition proved its generic identity with the Baobab or Monkey-Breadtree of Western Africa, which has hitherto remained the isolated representative of its genus. The Australian species, resembling its prototype most strikingly in the often colossal thickness of its stem and in its singular ramification, is evidently restricted to the north-western part of this continent, where Allan Cunningham assigned to it a range of 4° of longitude, and where the same extent of latitude limits its existence. The fruits, borne on a short stalk, contain a dry acidulous pulp, similar to that of *Adansonia digitata*.

Of two endemic kinds of *Cochlospermum* (Silk-cotton trees), one was found to be a native only of North-western Australia, whilst the other extended from around the Gulf of Carpentaria as far as Porter's Range on the Burdekin. A species of *Datura* (allied to *D. alba* of East India) is truly indigenous in the eastern interior: a *Calamus* ranges as far south as Moreton Bay; a second species of the New Zealandian genus *Teucridium* occurs in the hotter parts of Eastern Australia; an undescribed *Gossypium* (mentioned already by A. Cunningham) is dispersed throughout the tropics of this country; a third species of *Pandanus* indicates generally the permanency of fresh water; and the only indigenous *Sciadophyllum* seems to be analogous with *Sc. macrostachyum* of New Guinea, and occurs, according to the observations of Mr. C. Moore, as far south as Wide Bay. I may also draw attention to the wide northern range of the following genera, known formerly only from the extratropical zone of Australia; viz. *Seringia*, *Ke* *raudrenia*, *Rulingia*, *Oxylobium*, *Gompholobium*, *Lhotskya*, *Tryptomene*, *Astartea*, *Harmogia*, *Therogeron*, *Cyclotheca*, *Eremophila*, *Pholidia*, *Pithyrodia*, *Halgania*, and *Cladium*. Not less than sixty genera were observed during the progress of the expedition, which, although established in the floras of other countries, remained unnoticed by any writer on Australian botany: viz. *Stephania*, *Abelmoschus*, *Adansonia*, *Helicteres*, *Melochia*, *Riedleya*, *Melhania*, *Ximenia*, *Glycosmis*, *Hippocratea*, *Bergia*, *Nephelium*, *Cardiospermum*, *Azadirachta*, *Westonia*, *Wistaria*, *Agati*, *Æschynomene*, *Lourea*, *Dicerma*, *Taverniera*, *Atylosia*, *Rhynchosia*, *Tephrosia*, *Parinarium*, *Lumnitzera*, *Ludwigia*, *Luffa*, *Zehneria*, *Trianthema*, *Sesuvium*, *Mappa*, *Baloghia*, *Bridelia*, *Leptonema*, *Pluchea*, *Spilanthes*, *Soliva*, *Haplotaxis*, *Alstonia*, *Cerbera*, *Melodinus*, *Hydrolea*, *Bonnaya*, *Peplidium*, *Rhamphicarpa*, *Adhatoda*, *Dicliptera*, *Adenosmos*, *Teucridium*, *Helicia*, *Ephedra*, *Ouvirandra*, *Aponogeton*, *Hydrocharis*, *Cyanotis*, *Typhonium*, *Oryza*, *Campyloneuron*, and *Ceratopteris*.

A number of genera, at least quite as large as that of the preceding series, are not referable to any hitherto described, and will prove, I trust, a valuable contribution towards the botanical system, inasmuch as the discovery of new generic types assists in disclosing the laws of affinity in nature, connecting often those forms which are isolated by wide chasms, and aiding thus in the advancement and accomplishment of a truly natural system of the whole existing vegetation.

The amount of plants added by our travels to the Australian flora approaches to 800 species. A few of them are incidentally mentioned in the works previously quoted, none however introduced by systematical descriptions. How many of these are really new to science, and how many identical with Indian or Pacific forms, can only be ascertained by a comparison of European collections, and by access to a more extensive library than I have here at my command. Still I am under the impression that at least 500 of the additional plants are peculiar to Australia, and these must therefore be considered as contributions entirely new to botany.

According to a computation instituted in 1849 by R. Brown (in the Appendix to Sturt's 'Central Australia,' ii. pp. 90, 91), the number of plants known from New Holland and Van Diemen's Land scarcely amounted to 7000. Botanical researches in West Australia, Tasmania, South Australia and the colony of Victoria, have added since from places formerly inaccessible, exclusive of Cryptogamia, at least 1000 species.

Assuming that the increase of new Australian cryptogamic plants comprises 500 species, which cannot be considered overrated, when we remember how far alone our marine flora, through the investigations of Professor Harvey, became augmented; and if only, of those plants which resulted from the North Australian expedition, 500, as mentioned before, are regarded as wanting in the existing former collections;—I believe we may then safely assume, that we are at present more or less acquainted with 9000 Australian plants.

The scantiness of the vegetation observed by Capt. Sturt and by us towards Central Australia; the very limited number of new plants contained in a considerable collection formed by Mr. Wilhelmi, west of Spencer's Gulf; the extensive range of identical species along the tropical east coast, and your own observations on the decrease of plants towards the interior of Western Australia;—are sufficient reasons to anticipate, that botanical travellers in future will add scarcely 1000 truly distinct plants to those hitherto accumulated, and that, consequently (with the omission of minute fungi), the vegetable empire of all Australia, inclusive of Tasmania, does in all probability not comprise above 10,000 species.

Many of the indigenous vegetable productions proved eminently useful to the expedition; still it cannot be denied that their number, as far as ascertained, remains exceedingly limited, compared with the total of the plants observed; and attention has already been directed to most of them by Dr. Leichhardt; but in consequence of an extensive loss of specimens, he was deprived of the opportunity of determining many of those useful plants with botanical accuracy; and I shall therefore offer our own observations.

Nymphæa gigantea and a second species, both allied to the sacred Lotus of the ancient Egyptians (*Nymphæa lotus*), adorn in a variable shade of colours everywhere the waters of the warmer zone of Australia. The seed-vessels and the roots of these water-lilies form a large proportion of the vegetable food of the northern natives, and the former particularly will always be regarded as a providential gift in cases of need, by explorers of the North Australian wilderness. Yet more valuable, but less frequent, is *Nelumbium speciosum*, which reaches to East Australian extra-tropical latitudes. Being identical with the well-known Pythagorean Bean, it is needless to repeat here the uses of a plant which has been famous since the remotest antiquity. During the greater part of the journey, we were more or less extensively supplied with indigenous fruits. Thus the acidulous drupes of three Meliaceous trees (belonging to a new genus of the Trichilious section), the Nonda fruit of Dr. Leichhardt (now referred to *Parinarium*, and also observed on the islands of Torres Strait), a small kind of cucumber, a species of rose-apple (*Jambosa eucalyptoides*), the fruit of *Mimusops Kauki* (a plant restricted to the north-east coast), that of a broad-leaved species of *Terminalia*, the berries of *Physalis parviflora*, the small Lemon of the Brigalow Scrub (*Triphasia glauca*), the berries of Leichhardt's bread-tree (*Gardenia edulis*);—all these were periodically enjoyed, and added often to our diet those vegetable components so essentially required in the torrid zone. In this regard, we had almost daily occasion to praise the value of the purslane (*Portulaca oleracea*), which not only occurred in every part of the country explored, but also—principally in the neighbourhood of rivers—often in the greatest abundance. We found it, in sandy and grassy localities, so agreeably acidulous, as to use it for food without any preparation; and I have reason to attribute the continuance of our health, partially to the constant use of this valuable plant. The absence of other antiscorbutic herbs in the north, and the facility with which it may be gathered, entitle it to particular notice.

The Australian spinach (*Chenopodium erosum*), the New Zealandian (*Tetragonia expansa*), and the watercresses (*Nasturtium terrestre* and *Cardamine hirsuta*), which are in utility equal to the purslane, are almost confined to East Australia.

The clustered fig, the produce of a seemingly undescribed arborescent *Ficus*, proved second in importance only to the *Portulaca*, but was rarely available, except along the rivers of East and North-east Australia; and the native Mulberry (*Morus Calcar galli*) was nowhere noticed except on the subtropical portion of the east coast. The tender parts of the stem, and the base of the leaves of *Cymbidium canaliculatum*, the only orchid of the interior of tropical Australia, afforded a mucilaginous food; and the foliage of a *Hibiscus*, closely allied to *H. heterophyllus*, served as a substitute for sorrel. The gum of the *Terminalias*, *Sterculias*, and *Acacias* was seldom obtained, perhaps only in consequence of a season unfavourable for its exudation.

Livistonia inermis and an allied species supplied us occasionally with palm-cabbage; a similar substance, yielded by the Screwpines (*Pandanus spiralis* and *P. aquaticus*) seemed to be quite harmless, although it retained, even after boiling, some acidity.

In addition to these, there remain to be mentioned, the "Mackenzie Bean" (*Canavallia Baueriana*), the yam (*Dioscorea*), the tubers of *Aponogeton* and *Ouvirandra*, which are of a most agreeable taste, and the root of *Typha*. But the Tacca-tubers are only useful in the preparation of starch.

The plan of the expedition, according to which such an extensive part of the country was to be explored within a limited period, scarcely admitted of an inquiry into the qualities of the timber or into the medicinal or economical properties of the plants we met with, even in those cases where they were expected to exist.

With regard to the former, we regretted to observe in the northern and north-western portion of the continent almost generally the want of that size and regularity of growth for which many of the common trees are so much valued in the colonized parts of Australia. *Melaleuca Leucadendron* (the Indian Cajuput tree) forms the largest and straightest timber tree in the north. Pines were, with the exception of a solitary *Callitris*, nowhere observed except towards the east coast, and Casuarinas are wanting in the vicinity of the Victoria River; whilst our only northern species of this genus (*C. equisetifolia*), a timber-tree of the South-Sea Islands and of the coast tracts of India and Africa, was of universal occurrence around the Gulf of Carpentaria and on the east coast. The stately *Casuarina Decaisneana* we discovered in the sandy desert of Central Australia.

Of *Eucalyptus* occurred not less than 40 species. Two of these retain a scrubby habit and belong exclusively to the inland desert. Of the other species, the Flooded Gum-tree (*E. rostrata*, Schl., *E. acuminata*, Hook.), which is identical with the Yarra-tree of Sir T. Mitchell, and with the red Gum-tree of the South Australian colonists, was found to be universally distributed over the country. Its timber is well known for its durability and being capable of receiving a beautiful polish. Many of the Gum-trees are in their distribution limited by the dividing ranges, but that species named by the colonists "Moreton Bay Ash," advances to the south-east part of the Gulf of Carpentaria, whilst the so-called "Iron-bark tree," when suddenly appearing with the fall of the eastern waters, becomes at once a universal timber-tree.

Mr. C. Moore, who demonstrated the utility and unusual variety of the timber of East Australia so well in the Paris Exhibition, informs us that it is not *Oxleya xanthoxyla*, which supplies the kind of yellow wood, which attained some celebrity in New South Wales. According to an examination of the fruit, it is yielded by a second species of *Azadirachta*. The only indigenous *Erythroxylon*, a small tree not uncommon in East Australia, produces in all probability a red dye similar to that of its congeners.

With regard to the medical properties of the plants, observed during the expedition, I may allude to the tonic bitterness of several *Goodeniaceæ*, of *Canscora diffusa* (which is identical with *Orthostemon erectus*, R. Br.), and of a new genus of *Simarubeæ* (*Picroxylon*), with a wood similar to that of *Quassia*. The *Eucalyptus kino* might be procured in boundless quantities. The bark of the Red Cedar-tree (*Cedrela Australis*) seems to offer a good substitute for that of *Cedrela Toona* and *C. febrifuga*.

The occurrence of some virulent vegetable poison in North-west Australia manifested itself by the loss of several of our horses on three occasions, and I deplore that I failed to ascertain the plant which caused this calamity. In its effects this poison is even more active than that of *Gastrolobium* and *Gompholobium*, which are so destructive to the herds of Western Australia, and its action on the stomach of the animals inflammatory in a high degree. These losses happened on the rocky edges of the sandstone tableland near rivulets lined with *Pandanus spiralis*; but I searched in vain in these localities for plants, the natural alliance of which would justify any suspicion.

My previous remark on the preponderance of grasses, does not merely allude to their diversity in species, but applies equally to their gregarious distribution over a great part of the country. Numerous species of *Panicum* and *Andropogon*, several of *Anthistiria*, *Poa*, *Sporobolus*, *Ectrosia*, *Eriachne*, *Saccharum*, and *Rottboellia*, a *Paspalum*, a *Dactyloctenium*, a kind of rice, and many other grasses of equal value for pasture, cover either the basaltic plains, the valleys, or the fertile undulations. An *Ischæmum*-reed of vast abundance on the banks of the Victoria River offered additional food for our horses. But all the extensive sandstone elevations are devoid of nutritious forage, and the harsh or rigid forms of *Triodia*, *Aristida*, and *Triraphis* supersede the tender grasses of the lower ground.

The rainy season, which we observed to last from November till January, renews with a wonderful rapidity the grasses and the herbaceous vegetation at the hottest season. To this circumstance we have principally to ascribe the continuance of grass in a nutritious state throughout a longer period of the year than in many of the southern tracts of Australia. Dew and occasional showers of rain renew, even to some extent, the grasses in the cooler season, more particularly in localities denuded by bush-fires.

It would lead beyond the limits of this document to contemplate the botany of the country in its full details, but I may sketch the principal distinctive features of the vegetation, which in a comprehensive view can be divided into the following groups:—

1. Plants of the dense coast-forests.
2. „ of the Brigalow scrub.
3. „ of the open downs.
4. „ of the desert.
5. „ of the sandstone table-land.
6. „ of the sea-coast.
7. „ of the banks and valleys of rivers.

The first division, designated by the colonists the brushwood or cedar country, is characterized prominently by a great variety of umbrageous trees, chiefly of an Indian type. These forests occupy the slopes of ranges fronting the east coast, and seem to be dependent, not only on climate, but also, at least in some degree, on the decomposition of schistaceous rocks. The monotony of *Eucalyptus* here gives way to trees of the meliaceous, cedrelaceous, sapindaceous, euphorbiaceous, celastrinaceous, rubiaceous, and laurineous orders, intermixed with *Acronychia*, *Castanospermum*, *Erythrina*, *Ficus*, *Eupomatia*, and trees of other genera, often interrupted by a vast prevalence of noble Araucarias, matted together into an impervious thicket by *lianes* of *Calamus*, of asclepiadeous, apocynaceous, convolvulaceous, menispermaceous, and ampelideous plants, and harbouring in their shade numerous parasitical orchids and ferns.

2. The Brigalow scrub, peculiar apparently to a rather argillaceous sandstone, stretches in East Australia over the elevated plains west of the coast range as far north as Newcastle range; and some of its plants transgress even the elevations which separate the waters of the east coast from those of the Gulf of Carpentaria. Its plants are varied in the extreme; typical of it are, however, shrubs or small trees of *Capparis*, *Pittosporum*, *Heterodendron*, *Triphasia glauca*, *Geijera*, *Brachychiton*, *Cassia*, *Acacia*, *Myoporum*, *Canthium*, *Ehretia*, *Bauhinia Hookeri* and *Bauhinia Carroni*, *Anthobolus leptomerioides*, *Delabechea rupestris*, and principally *Eremophila Mitchelli* and *Strzeleckia dissosperma*. *Eucalypti*, often of considerable size, are dispersed through the Brigalow scrub. In a modification of this botanical feature of the country,

distinguished as the Bottletree scrub, *Delabechea*, *Bauhinia* and *Brachychiton* prevail, seemingly ruled by the presence of basalt, conglomerate, or lime.

3. The open downs of basaltic origin are in many instances surrounded by the Brigalow, or are bordered by the desert. Except along the watercourses, they are nearly destitute of trees, and for the greater part of the year utterly devoid of water. The rich soil readily absorbs the rain, and produces thus a luxuriant herbaceous vegetation. Grasses are here, as stated before, abundant, and cannot in their pastoral value be surpassed. Plants of the genera *Abelmoschus*, *Hibiscus*, *Sida*, *Crotalaria*, *Sesbania*, *Neptunia*, *Cucumis*, *Wedelia*, *Wollastonia*, *Spilanthes*, *Glossogyne*, *Portulaca*, *Gomphrena*, *Pimelea*, *Commelyna*, *Cæsia*, *Bulbine*, &c. are conspicuous, and a marked increase of *Compositæ* is perceptible in those parts of this formation nearest to the eastern coast, where also the occurrence of a new *Verbena* suggested the appellation "Vervain plains" for a certain tract of this country.

4. The desert is, according to the varied character of its sandy, saline, or argillaceous soil, extremely changeable in its flora; but the generality of its plants agrees so well with the genera, and even species, of the barren tracts of the south, as to render their explication here unnecessary. *Trianthema*, *Newcastelia*, *Microcassia*, *Gomphrena*, *Ptilotus*, and a few other desert plants seem not to spread far southward. Acacia forests cover the rising ground.

5. The sandstone table-land forms in its endless extent a landscape equally arid and cheerless. *Eucalypti*, often diminutive, some with lamellar bark and brilliant orange and scarlet flowers, a dwarf *Thouinia*, some *Hibisci*, *Brachychiton ramiflorum*, *Cochlospermum*, *Dodonææ*, *Distichostemon*, *Corchorus*, *Owenia*, *Boronia*, *Zizyphus*, *Buchanania*, *Terminaliæ*, *Jacksoniæ*, *Oxycladium*, *Nematophyllum*, *Bossiæa*, *Indigofera*, *Psoralea*, *Zornia*, *Atylosia*, *Erythrina Vespertilio*, *Bauhinia Leichardtii*, *Laboucheria* (the leguminous Iron-bark tree of Dr. Leichhardt), numerous Acacias, various species of *Calycothrix* and *Melaleuca*, *Lhotzkya cuspidata*, *Verticordia Cunninghami*, *Xanthostemon paradoxus*, *Gardenia*, *Petalostigma*, *Scævolæ*, *Goodeniæ*, *Sersalisia*, *Strychnos*, *Spathodea*, many species of *Heliotropium*, *Balfouria saligna*, *Gyrocarpus sphenopterus*, *Persoonia falcata*, *Hakea arborescens*, a considerable number of *Grevilleas*, and *Santalum lanceolatum* constitute, with the above-mentioned *Aristida*, *Triodia* and *Triraphis*, its principal vegetation, *Livistona inermis* gracing now and then its declivities.

6. For the characteristics of the sea-coast we have principally to

refer to the mangrove plants with their usual companions, viz. *Ceriops*, *Rhizophora*, *Bruguiera*, *Avicennia*, *Suriana*, *Ægiceras*, *Ægialitis*, *Pemphis*, &c. On the sandy coast, *Colubrina asiatica*, *Pandanus*, *Spinifex fragilis*, *Triumfetta procumbens*, *Tribulus*, &c., are conspicuous.

7. The following plants are, along the banks of the northern rivers, of frequent occurrence:—the broad-leaved *Terminalia Chuncoa* (the raspberry-tree of Leichhardt), *Jambosa eucalyptoides*, *Morinda Leichhardtii*, *Inga moniliformis*, *Warringtonia*, *Agati*, *Polygonum Cunninghami* (which surrounds also frequently the lagoons of the interior), *Pandanus*, *Melaleuca Leucadendron*, *Eucalyptus rostrata*, &c., whilst the vegetation of the grassy valleys bears a resemblance to that of the basaltic downs.

Several other localities with a vegetation of their own, but of less extent or not sufficiently known, cannot be noted on this occasion. Thus the porphyritic ranges which separate the rivers of the Gulf of Carpentaria from those of the eastern coast, the granitic valley of the Nicholson, and other places, are productive of plants which rely upon peculiar geological structures.

I beg to transmit with this report the remaining number of systematical descriptions of new or rare plants, drawn up almost exclusively on the spots of discovery, and which illustrate, with the addition of those forwarded on the former occasions, nearly 600 species; but I have to regret, that in consequence of the destruction of part of the botanical collections on board of the "Messenger," I am not enabled to accompany, in a few instances, these manuscripts with corresponding specimens.

I beg also to append to this communication two lists of plants. In the first I have endeavoured to determine the northern limits of 243 species from the more southern latitudes of Australia, which gradually appeared on the lines of exploration from lat. 17° 30′ south, to lat. 27° south. Probably a slight variation in their range will be observed hereafter under other meridians: still I believe that the limits assigned to them will be found approximately correct for the eastern part of the country within a moderate distance from the coast. The second Appendix contains a systematical catalogue of nearly all the genera of plants observed during the journey, with their respective number of species; and this may serve as an outline of the tropical vegetation of Australia.

In conclusion, I perform a pleasing duty in acknowledging most thankfully the ample opportunities offered by yourself for the prosecution of my labours, which I found facilitated to the fullest extent, as far as circumstances would permit.

I have also to acknowledge contributions towards the botanical collections from all the officers of the expedition, and although those additions yielded but a very small number of species not observed by myself, yet I was thus enabled to reexamine many plants in a more perfect state of development.

I am placed under the greatest obligation to Mr. Walter Hill, Curator of the Brisbane Botanic Garden, not only for communicating some valuable and unique specimens, but also for his disinterestedness in assisting me with his local knowledge of the Moreton Bay district, in obtaining many botanical rarities which I otherwise should have failed to procure; and it remains for me to express likewise my thanks to Mr. C. Moore, Director of the Botanic Garden at Sydney, for providing me with ample room for arranging the herbarium, for giving me unlimited access both to the library and the collections of his establishment, and for rendering numerous services to alleviate my labours in Sydney.

To his Excellency the Governor-General I owe the deepest gratitude for entrusting to me the phytological investigation of such an ample and interesting tract of country, a favour, which I can—reflecting on the rarity of such occasions for research—never sufficiently acknowledge; and finally, I feel proud to state, that, through the usual liberality of Sir William Hooker, I am permitted by Her Majesty's Government to retain a set of botanical specimens, in order to elucidate hereafter to the fullest extent the flora of tropical Australia.

I have the honour to be, Sir,
Your most obedient and humble servant,
FERDINAND MULLER,
Botanist to the North-Australian Expedition.

APPENDIX I.

Showing the range of Extratropical Australian Plants towards the North, as observed during the North-Australian Expedition.

From lat. 17° 30′ *to* 18° 30′ *south.*

Polygonum plebeium, *R. Br.*
Solanum verbascifolium, *L.*
——— nigrum, *L.*
Teucrium argutum, *R. Br.*
Eremophila Mitchelli, *Benth.*

From lat. 18° 30′ *to* 19° *south.*

Chenopodium erosum, *R. Br.*
Bauhinia Hookeri, *Ferd. Mull.*
Vittadinia cuneata, *D.C.*
Plectranthus parviflorus, *W.*
Ruellia Australis, *R. Br.*

Eranthemum variabile, *R. Br.*
Helichrysum lanuginosum, *A. Cunn.*
Oxalis corniculata, *L.*
Hydrocotyle asiatica, *L.*
Calotis scapigera, *Hook.*
——— dilatata, *A. Cunn.*
Verbena officinalis, *L.*
Strzeleckia dissosperma, *F. Muller.*

From lat. 19° *to* 20° *south.*

Geijera latifolia, *Lindl.*
Nasturtium terrestre, *R. Br.*
Xerotis longifolia, *R. Br.*
Rytidochlamys Mitchelli, *Sond.*
Rumex Brownii, *Campd.*
Siegesbeckia orientalis, *L.*
Juncus pallidus, *R. Br.*
Usnea barbata, *Ach.*
Alyxia ruscifolia, *R. Br.*
Lythrum Hyssopifolium, *L.*
Convolvulus erubescens, *Sims.*
Polygonum lapathifolium, *H. Kew.*
Gnaphalium involucratum, *Forst.*
Eclipta erecta, *L.*
Heterodendron oleifolium, *Desf.*
Azolla pinnata, *R. Br.*

From lat. 20° *to* 21° *south.*

Canthium oleifolium, *Hook.*
Scævola spinescens, *R. Br.*
Dipodium punctatum, *R. Br.*
Goodenia geniculata, *R. Br.*
Anthobolus leptomeroides, *n. sp.*

From lat. 21° *to* 22° *south.*

Velleya macrocalyx, *Vriese.*
Goodenia hederacea, *R. Br.*
Myoporum dulce, *Bth.*
Senecio rupicola, *Less. & Rich.*
Pholidia polyclada, *Ferd. Muller.*
Triphasia glauca, *Lindl.*
Cassia circinata, *Bth.*
—— canaliculata, *R. Br.*

From lat. 22° *to* 23° *south.*

Pomax Solandri, *Ferd. Muller.*
Tricoryne scabra, *R. Br.*
Erechthites, *sp.*
Daucus brachiatus, *Sieb.*
Calotis microcephala, *Bth.*
Abutilon diplotrichum, *F. Muller.*
Ajuga Australis, *R. Br.*
Acacia juniperina, *W.*
Blitum glandulosum, *Moqu.*
Picris angustifolia, *D.C.*
Cassia platypoda, *R. Br.*

From lat. 23° *to* 24° *south.*

Bulbine bulbosa, *R. & S.*
Indigofera brevidens, *W.*
Scævola microcarpa, *Cuv.*
Swainsonia coronillifolia, *Salisb.*
Hypoxis hygrometrica, *Labill.*
Psoralea tenax, *Lindl.*
Pycnosorus globosus, *Bth.*
Thysanotus tuberosus, *R. Br.*
Aneilema graminea, *R. Br.*
Pratia Cunninghami, *Hook. fil.*
Mimulus gracilis, *R. Br.*
Tetragonia expansa, *L. fil.*
Zygophyllum apiculatum, *F. Mull.*
Atriplex semibaccata, *R. Br.*
Lespedeza juncea, *Pers.*
Andropogon Sieberi, *Kunth.*
Asperula divaricata, *Bisch.*
Pimelea microcephala, *R. Br.*
Stackhousia asperococca, *Salisb.*
Polygonum prostratum, *R. Br.*
Cuscuta Australis, *R. Br.*
Brachycome graminea, *F. Muller.*
Carex inversa, *R. Br.*
Cyperus enervis, *R. Br.*

From lat. 24° *to* 25° *south.*

Funaria hygrometrica, *Hedw.*
Brachychiton populneum, *R. Br.*
Cassia vittata, *R. Br.*
Rubus macropodus, *Séringe.*
Xanthorrhœa arborea, *Sm.*
Macrozamia spiralis, *Miqu.*
Adiantum Æthiopicum, *W.*
———— hispidulum, *Sm.*
Poranthera microphylla, *Brongn.*

Pimelea glauca, *R. Br.*
Velleya paradoxa, *R. Br.*
Hydrocotyle densiflora, *D.C.*
Thesium Australe, *R. Br.*
Exocarpus cupressiformis, *Labill.*
Leuzea Australis, *D.C.*
Helipterum punctatum, *D.C.*
Cassytha paniculata, *R. Br.*
Scirpus maritimus, *L.*
——— lacustris, *L.*
Ranunculus lappaceus, *Sm.*
Cynoglossum Australe, *R. Br.*
Dichondra repens, *R. Br.*

From lat. 25° to 26° south.

Plantago debilis, *R. Br.*
Angophora eucalyptoides, *F. Mull.*
Scirpus mucronatus, *L.*
Calotis dentex, *R. Br.*
Pultenæa retusa, *Sm.*
Mentha saturejoides, *R. Br.*
Veronica calycina, *R. Br.*
Sambucus Gaudichaudiana, *D.C.*
Polygonum gracile, *R. Br.*
Cyperus venustus, *R. Br.*
Clematis glycinoides, *D.C.*
Solanum aviculare, *Forster.*

From lat. 26° to 27° south.

Juncus prismatocarpus, *R. Br.*
Goodenia bellidifolia, *Sm.*
——— paniculata, *Sm.*
Opercularia varia, *Hook.*
Pimelea gracilis, *R. Br.*
Brasenia peltata, *Pursh.*
Potamogeton obtusifolius, *Mert. & Koch.*
Brunonia sericea, *Sm.*
Gratiola pedunculata, *R. Br.*
Viola betonicifolia, *Sm.*
Daviesia ulicina, *Sm.*
——— ruscifolia, *A. Cunn.*
Lepidium hyssopifolium, *Desf.*
Stylidium graminifolium, *Sm.*
Beyera oblongifolia, *Kl.*
Carex appressa, *R. Br.*
Morinda jasminoides, *A. Cunn.*
Polygala veronica, *Ferd. Muller.*
Microtis parviflora, *R. Br.*
Cladium junceum, *R. Br.*
Cycnogeton Huegelii, *Endl.*
Cinna ovata, *Kunth.*
Harmogia virgata, *Schauer.*
Pteris esculenta, *Forst.*
Platycerium alcicorne, *Desv.*
Davallia pyxidata, *Sm.*
Cynoglossum latifolium, *R. Br.*
Rubus rosæfolius, *L.*
Caustis pentandra, *R. Br.*
Carex longifolia, *R. Br.*
—— littorea, *Labill.*
Lycopus Australis, *R. Br.*
Viola hederacea, *Labill.*
Lepidosperma exaltatum *et* laterale, *R. Br.*
Juncus vaginatus, *R. Br.*
——— maritimus, *Lam.*
Polygonum strigosum, *R. Br.*
Festuca littoralis, *Labill.*
Microlæna stipoides, *R. Br.*
Billardiera scandens, *Sm.*
Jonidium filiforme, *D.C.*
Drosera binata, *Labill.*
——— peltata, *Sm.*
Comesperma acutifolium, *Steetz.*
——— retusum, *Labill.*
Tetratheca ciliata, *Labill.*
Polycarpon alsinifolium, *D.C.*
Commersonia Fraseri, *Gay.*
Geranium pilosum, *Forst.*
Erodium cygnorum, *Nees.*
Phyllota squarrosa, *Bth.*
Aotus villosa, *Sm.*
Dillwynia ericifolia, *Sm.*
Pultenæa villosa, *Sm.*
——— retusa, *Sm.*
Hovea linearis, *R. Br.*
Platylobium formosum, *Sm.*
Bossiæa ensata, *Sieb.*
Kennedya splendens, *Paxt.*
Hardenborgia monophylla, *Bth.*
Acacia suaveolens, *W.*

Acacia Sophoræ, *R. Br.*
Epilobium Billardieri, *Sér.*
Tillæa verticillaris, *D.C.*
Callicoma serratifolia, *R. Br.*
Mesembryanthemum æquilaterale, *Haw.*
Actinotus Helianthi, *Labill.*
Trachymene ovata, *D.C.*
Petroselinum prostratum, *D.C.*
Astrotricha longifolia, *Bth.*
Sambucus xanthocarpa, *F. Muller.*
Ricinocarpus pinifolius, *Desf.*
Solenogyne bellioides, *Cass.*
Lobelia anceps, *Thunb.*
——— gibbosa, *Labill.*
——— pedunculata. *R. Br.*
Scævola suaveolens, *R. Br.*
Styphelia viridiflora, *R. Br.*
Lissanthe daphnoides, *R. Br.*
Leucopogon Richei, *R. Br.*
—— affinis, *R. Br.*
—— juniperinus, *R. Br.*
—— ericoides, *R. Br.*
Monotoca elliptica, *R. Br.*
Epacris pulchella, *R. Br.*
—— obtusifolia, *Sm.*
—— purpurascens, *R. Br.*
Ponceletia sprengelioides, *R. Br.*
Melichrus, *sp.*
Trochocarpa laurina, *R. Br.*
Myrsine variabilis, *R. Br.*
Villarsia parnassifolia, *Labill.*
Calystegia marginata, *R. Br.*
Prostanthera linearis, *R. Br.*
Conospermum taxifolium, *Sm.*
Persoonia tenuifolia, *R. Br.*
—— virgata, *R. Br.*
—— lanceolata, *Sm.*
Banksia latifolia, *R. Br.*
—— oblongifolia, *Cav.*
—— serrata, *L. Suppl.*
—— integrifolia, *L. Suppl.*
Leptomeria acida, *R. Br.*
Casuarina tenuissima, *Sieb.*
Cryptostylis longifolia, *R. Br.*
Spiranthes Australis, *Labill.*
Pterostylis ophioglossa, mutica, *et* concinna, *R. Br.*
Acianthus fornicatus, *R. Br.*
Corysanthes unguiculata, *R. Br.*
Chiloglottis diphylla, *R. Br.*
Cyrtostylis reniformis, *R. Br.*
Glossodia minor, *R. Br.*
Sowerbæa juncea, *Sm.*
———— sericea, *Sm.*

APPENDIX II.

Systematic Index of the Genera of Plants observed during Mr. Gregory's Expedition in tropical and Eastern subtropical Australia; with the addition of the approximate number of Species either noticed or collected by Dr. Ferd. Müller, *Botanist to the Expedition.*

THALAMIFLORÆ.

Ranunculaceæ.	SP.	
Ranunculus	2	
Clematis	1—	3
Dilleniaceæ.		
Hibbertia	8	
Pleurandra	2	
Hemistemma	3	
Pachynema	1—	14

Anonaceæ.		SP.
Eupomatia		1
Menispermeæ.		
Cocculus	3	
Stephania	1—	4
Nymphæaceæ.		
Nymphæa		2

THALAMIFLORÆ (*continued*).

Nelumbineæ.		SP.
Nelumbium		1
Cabombeæ.		
Brasenia		1
Cruciferæ.		
Cardamine	1	
Nasturtium	1	
Lepidium	1—	3
Capparideæ.		
Capparis	8	
Cleome	3	
Rœpera	1—	12
Violarinæ.		
Ionidium	3	
Viola	2—	5
Droseraceæ.		
Drosera	6	
Byblis	1—	7
Polygaleæ.		
Polygala	4	
Comesperma	4—	8
Tremandreæ.		
Tetratheca		1
Pittosporeæ.		
Pittosporum	5	
Billardiera	1	
Ixiosporum	1	
Hymenosporum	1	
Citriobatus	1	
Bursaria	1—	10
Frankeniaceæ.		
Frankenia		1
Caryophylleæ.		
Polycarpæa	5	
Polycarpon	1—	6
Surianeæ.		
Suriana		1
Phytolacceæ.		
*Phytolacca	1	
Cyclotheca	1—	2

Malvaceæ.		SP.
Malva	2	
Sida	13	
Abutilon	8	
Pavonia	1	
Abelmoschus	2	
Hibiscus	17	
Gossypium	1—	44
Bombaceæ.		
Adansonia	1	
Methorium	3	
Helicteres	1	
Sterculia	1	
Delabechea	1	
Brachychiton	4—	11
Cochlospermeæ.		
Cochlospermum		2
Tiliaceæ.		
Grewia	3	
Triumfetta	6	
Corchorus	6—	15
Buttneriaceæ.		
Seringia	1	
Keraudrenia	2	
Rulingia	2	
Commersonia	1	
Dicarpidium	1	
Waltheria	1	
Melochia	1	
Riedleja	1	
Melhania	1—	11
Elæocarpeæ.		
Elæocarpus		2
Olacinæ.		
Ximenia	1	
Olax	2—	3
Aurantiaceæ.		
Triphasia	1	
Glycosmis	1	
Limonia	1—	3
Hypericinæ.		
Hypericum		1

THALAMIFLORÆ (*continued*).

Elatineæ.	SP.	
Elatine	1	
Bergia	3—	4
Guttiferæ.		
Calophyllum		1
Hippocrateæ.		
Hippocratea		1
Erythroxyleæ.		
Erythroxylon		1
Sapindaceæ.		
Dodonæa	9	
Distichostemon	1	
Heterodendron	2	
Nephelium	5	
Cupania	5	
Thouinia	2	
Schmiedelia	1	
Cardiospermum	1	
Apophyllum	1—	27
Meliaceæ.		
Elseya	1	
Azadirachta	1	
Owenia	5	
Hartighsea	3	
Melia	1	
Carapa	1—	12

Ampelideæ.	SP.	
Cissus	9—	9
Geraniaceæ.		
Geranium	1	
Erodium	1—	2
Oxalideæ.		
Oxalis		1
Zygophylleæ.		
Zygophyllum	1	
Tribulopsis	3	
Tribulus	3—	7
Rutaceæ.		
Geijera	3	
Euodia	1	
Eriostemon	2	
Zieria	1	
Boronia	8—	15
Xanthoxyleæ.		
Acronychia		3
Simarubeæ.		
Picroxylon		1
Cedreleæ.		
Flindersia	1	
Strzeleckia	1	
Oxleya	1	
Cedrela	1—	4

CALYCIFLORÆ.

Stackhousieæ.		
Stackhousia	3	
Celastrinæ.		
Osteotheca	2	
Catha	4	
Celastrus	2	
Elæodendron	1—	9
Rhamneæ.		
Zizyphus	2	
Colubrina	1	
Alphitonia	1	
Ventilago	1—	5
Anacardiaceæ.		
Buchanania	1	
Leguminosæ.		
Oxylobium	2	
Podolobium	2	
Gompholobium	3	

Leguminosæ (continued).	
Jacksonia	5
Oxycladium	1
Daviesia	2
Phyllota	1
Aotus	1
Dillwynia	1
Euchilus	1
Pultenæa	7
Mirbelia	1
Hovea	4
Platylobium	1
Nematophyllum	1
Bossiæa	5
Crotalaria	12
Westonia	1
Lotus	1

CALYCIFLORÆ (*continued*).

Leguminosæ (continued).	SP.
Indigofera	12
Psoralea	8
Psoralina	3
Tephrosia	6
Wistaria	2
Sesbania	4
Agati	1
Swainsonia	2
Zornia	6
Æschynomene	2
Lourea	1
Dicerma	1
Taverniera	1
Lespedeza	1
Desmodium	7
Tetracommæa	1
Kennedya	1
Hardenbergia	1
Leptocyamus	2
Galactia	1
Canavalia	1
Mucuna	1
Phaseolus	1
Plagiotropis	1
Vigna	3
Erythrina	3
Atylosia	3
Rhynchosia	1
Abrus	1
Dichromosperma	1
Sophora	1
Castanospermum	1
Barklya	1
Microcassia	1
Labichea	1
Petalogyne	2
Brewsteria	1
Cassia	15
Cæsalpinia	1
Bauhinia	3
Laboucheria	1
Neptunia	2
Inga	1
Acacia	50—212

Rosaceæ.		SP.
Rubus		3
Chrysobalaneæ.		
Parinarium		2
Combretaceæ.		
Terminalia	9	
Chuncoa	1	
Lumnitzera	1—	11
Alangieæ.		
Pseudalangium		1
Melastomaceæ.		
Melastoma	1	
Osbeckia	1—	2
Rhizophoreæ.		
Ceriops	1	
Rhizophora	1	
Bruguiera	1	
Carallia	1—	4
Onagreæ.		
Epilobium	1	
Jussiæa	2	
Ludwigia	1—	4
Halorageæ.		
Myriophyllum	3	
Haloragis	4—	7
Callitrichinæ.		
Callitriche		1
Ceratophylleæ.		
Ceratophyllum		1
Lythraceæ.		
Lythrum	2	
Calopeplis	1	
Basistemon	1	
Ammannia	3	
Pemphis	1—	8
Myrtaceæ.		
Calycothrix	7	
Lhotzkya	1	
Homalocalyx	1	
Tryptomene	1	
Verticordia	1	

CALYCIFLORÆ (*continued*).

Myrtaceæ (continued).	SP.	
Darwinia	1	
Astartea	1	
Harmogia	2	
Bæckia	2	
Tristania	4	
Callistemon	3	
Melaleuca	8	
Leptospermum	4	
Lysicarpus	1	
Xanthostemon	2	
Angophora	3	
Eucalyptus	40	
Lithomyrtus	1	
Acmene	2	
Eugenia	3	
Jambosa	2	
Barringtonia	2—	92
Cucurbitaceæ.		
Luffa	2	
Cucumis	2	
Cucurbitella	1	
Trichosanthes	3	
Bryonia	1	
Zehneria	1	
Lagenaria	1—	11
Passifloreæ.		
Disemma		2
Portulaceæ.		
Portulaca	7	
Calandrinia	2	
Trigastrotheca	1	
Mollugo	2	
Trianthema	3	
Brachypyxis	2	
Sesuvium	1	
Glinus	1	
Tetragonia	1—	20
Mesembryanthemeæ.		
Mesembryanthemum		1
Crassulaceæ.		
Tillæa		1
Cunoniaceæ.		
Callicoma		1

Escallonieæ.		SP.
Hemidistylis		1
Umbelliferæ.		
Hydrocotyle	7	
Hemicarpus	3	
Didiscus	1	
Xanthosia	1	
Actinotus	1	
Trachymene	2	
Platycarpidium	1	
Astrotricha	1	
Petroselinum	1	
Helosciadium	1	
Daucus	1	
Eryngium	2—	22
Araliaceæ.		
Panax	1	
Sciadophyllum	1—	2
Caprifoliaceæ.		
Sambucus		2
Loranthaceæ.		
Loranthus	15	
Tupeia	2	
Viscum	1—	18
Rubiaceæ.		
Asperula	3	
Pomax	1	
Opercularia	2	
Spermacoce	5	
Cephaelis	1	
Psychotria	4	
Pavetta	3	
Canthium	6	
Pogonolobus	1	
Morinda	2	
Creocarpus	1	
Nertera	1	
Hedyotis	6	
Rondeletia	1	
Gardenia	4	
Guettarda	1—	42
Euphorbiaceæ.		
Euphorbia	6	
Excœcaria	1	

CALYCIFLORÆ (*continued*).

Euphorbiaceæ (continued).	SP.	
Omalanthus	2	
Cœlebogyne	1	
Elachocroton	1	
Tragia	1	
Petalostigma	1	
Echinocroton	1	
Acalypha	2	
Amperea	1	
Mappa	1	
Baloghia	1	
Ricinocarpus	1	
Bertya	1	
Adriana	1	
Beyera	1	
Croton	6	
Monococcus	1	
Briedelia	1	
Phyllanthus	7	
Synostemon	4	
Melanthesa	2	
Leptonema	1	
Micranthemum	1	
Glochidion	2	
Elachopetalum	1	
Poranthera	1—	50

Compositæ.	SP.	
Vernonia	1	
Eurybia	2	
Vittadinia	2	
Therogeron	1	
Minuria	1	
Calotis	5	
Brachycome	5	
Lagenophora	1	
Solenogyne	1	
Sphæranthus	2	
Conyza	1	
Spiropodium	1	
Blumea	5	
Pluchea	2	
Rhodanthemum	4	
Oliganthemum	1	
Monenteles	3	
Eclipta	1	
Siegesbeckia	1	
Wedelia	3	
Wollastonia	3	
Bidens	2	
Diodontium	1	
Spilanthes	2	
Glossogyne	2	
Flaveria	1	
Cotula	1	
Myriogyne	3	
Sphæromorphæa	1	
Soliva	1	
Calocephalus	1	
Pycnosorus	1	
Cassinia	1	
Ozothamnus	1	
Rutidosis	2	
Ixiolæna	1	
Rytidochlamys	1	
Podolepis	3	
Chrysocephalum	1	
Helichrysum	4	
Helipterum	2	
Gnaphalium	3	
Erechthites	2	
Senecio	2	
Coleocoma	1	
Haplotaxis	1	
Kippistia	1	
Leuzea	1	
Picris	1	
*Crepis	1	
Sonchus	2—	93

Stylidieæ.		
Stylidium		16

Lobeliaceæ.		
Lobelia	9	
Pratia	1—	10

Campanulaceæ.		
Wahlenbergia		1

Goodeniaceæ.		
Goodenia	20	
Calogyne	1	

CALYCIFLORÆ (*continued*).

Goodeniaceæ (continued).	SP.	
Velleya	4	
Dampiera	2	
Leschenaultia	1	
Scævola	9—	37
Epacrideæ.		
Styphelia	1	
Lissanthe	1	

Epacrideæ (continued).	SP.	
Leucopogon	8	
Monotoca	2	
Epacris	3	
Ponceletia	1	
Melichrus	1	
Acrotriche	1	
Trochocarpa	1—	19

COROLLIFLORÆ.

Myrsineæ.		
Myrsine	1	
Ægiceras	1—	2
Sapoteæ.		
Mimusops	1	
Sersalisia	3	
Ixiocarpus	1—	5
Ebenaceæ.		
Diospyros	1	
Maba	4—	5
Oleinæ.		
Olea	1	
Notelæa	3—	4
Jasmineæ.		
Jasminum		6
Loganiaceæ.		
Strychnos	1	
Logania	1	
Dichotomostachys	1	
Mitrasacme	16—	19
Gentianeæ.		
Limnanthemum	4	
Villarsia	1	
Canscora	1	
Erythræa	1—	7
Apocyneæ.		
Parsonsia	6	
Lyonsia	1	
Balfouria	1	
Wrightia	1	
Alstonia	2	
Tabernæmontana	1	
Carissa	2	
Cerbera	1	
Melodinus	1	
Alyxia	1—	17

Asclepiadeæ.		
Microstemma	2	
Cynoctonum	5	
Bidaria	2	
Leichhardtia	1	
Gongronema	2	
Gymnema	1	
Marsdenia	4	
Tylophora	2	
Oxystelma	1	
Gymnanthera	1	
Hoya	1	
Sarcostemma	1	
Rhyncharrhena	1—	24
Bignoniaceæ.		
Tecoma	3	
Spathodea	2—	5
Hydrophylleæ.		
Hydrolea		1
Convolvulaceæ.		
Calystegia	1	
Convolvulus	2	
Ipomœa	17	
Breweria	3	
Polymeria	2	
Evolvulus	1	
Cressa	1	
Dichondra	1	
Cuscuta	1—	29
Boragineæ.		
Heliotropium	9	
Lobophyllum	1	
Cynoglossum	3	
Trichodesma	3	
Tournefortia	2	
Halgania	1	
Ehretia	1—	20

COROLLIFLORÆ (*continued*).

	SP.	
Solaneæ.		
Solanum	25	
Physalis	2	
Nicotiana	1	
Datura	1—	29
Scrophularinæ.		
Duboisia	1	
Büchneria	2	
Vandellia	3	
Bonnaya	3	
Mimulus	3	
Microcarpæa	1	
Limnophila	1	
Gratiola	2	
Centranthera	1	
Veronica	1	
Morgania	2	
Peplidium	1	
Herpestis	1	
Rhamphicarpa	1	
Stemodia	2	
Scoparia	1	
Artanema	1—	27
Acanthaceæ.		
Stemodiopsis	1	
Adenosma	1	
Ruellia	1	
Eranthemum	1	
Rostellularia	2	
Adhatoda	1	
Hygrophila	1	
Dicliptera	1	
Hypoestes	2	
Nelsonia	1—	12
Lentibulariæ.		
Utricularia		8

	SP.	
Primulaceæ.		
Micropyxis		1
Pedalinæ.		
Josephinia		2
Myoporinæ.		
Myoporum	5	
Pholidia	3	
Stenochilus	3	
Eremophila	3—	14
Verbenaceæ.		
Avicennia	2	
Clerodendron	5	
Vitex	5	
Premna	2	
Pityrodia	1	
Newcastelia	1	
Dennisonia	1	
Callicarpa	3	
Teucridium	1	
Verbena	3	
Lippia	1—	25
Labiatæ.		
Lycopus	1	
Salvia	1	
Westringia	1	
Ajuga	1	
Anisomeles	3	
Teucrium	3	
Mentha	3	
Plectranthus	6	
Prostanthera	1—	20
Plumbagineæ.		
Plumbago	1	
Ægialitis	1—	2
Plantagineæ.		
Plantago		1

MONOCHLAMYDEÆ.

Nyctagineæ.		
Boerhaavia		1
Amaranthaceæ.		
Alternanthera	3	
Trichinium	8	
Gomphrena	5	

Amaranthaceæ (continued).		
Ptilotus	3	
Nyssanthes	2	
Amaranthus	3	
Achyranthes	1	
Deeringia	1—	26

MONOCHLAMYDEÆ (*continued*).

Salsoleæ.	SP.	
Blitum	2	
Rhagodia	3	
Chenopodium	3	
Atriplex	4	
Anisacantha	3	
Kentropsis	1	
Kochia	3	
Enchylæna	1	
Salsola	1	
Chenopodina	1	
Arthrocnemum	1	
Halocnemum	2—	25
Polygoneæ.		
Muehlenbeckia	1	
Polygonum	9	
Rumex	3—	13
Laurineæ.		
Cryptocarya	1	
Tetranthera	2	
Cassytha	2	
Gyrocarpus	1—	6
Proteaceæ.		
Conospermum	1	
Helicia	1	
Persoonia	5	
Orites?	1	
Grevillea	22	
Hakea	7	
Lomatia	1	
Stenocarpus	2	
Banksia	5—	45

Thymeleæ.	SP.	
Wickstrœmia	1	
Pimelea	9—	10
Santalaceæ.		
Anthobolus	2	
Santalum	1	
Exocarpus	2	
Leptomeria	1	
Thesium	1—	7
Urticeæ.		
Aphananthus	1	
Urtica	2	
Parietaria	1	
Morus	2	
Dorstenia	1	
Ficus	12—	19
Casuarineæ.		
Casuarina		6
Coniferæ.		
Frenela	4	
Podocarpus	1	
Araucaria	2—	7
Ephedreæ.		
Ephedra		1
Cycadeæ.		
Macrozamia	1	
Cycas	2—	3
Piperaceæ.		
Piperomia		2

MONOCOTYLEDONEÆ.

Orchideæ.		
Calanthe	1	
Spiranthes	1	
Microtis	1	
Dipodium	2	
Cryptostylis	1	
Cymbidium	3	
Dendrobium	3	
Sarcochilus	1	
Pterostylis	6	
Caladenia	2	

Orchideæ (continued).		
Acianthus	1	
Corysanthes	1	
Chiloglottis	1	
Arthrochilus	1	
Cyrtostylis	1	
Glossodia	1	
Oberonia	1—	28
Philydreæ.		
Philydrum		1

MONOCOTYLEDONEÆ (*continued*).

Irideæ.		SP.
Patersonia		2
Amaryllideæ.		
Calostemma	1	
Crinum	3—	4
Scitamineæ.		
Hellenia		1
Hydrocharideæ.		
Anacharis	1	
Hydrocharis	1	
Ottelia	2	
Vallisneria	2—	6
Najadeæ.		
Najas		2
Zosteraceæ.		
Thalassia		2
Alismaceæ.		
Alisma		2
Juncagineæ.		
Cycnogeton	2	
Ouvirandra	2	
Aponogeton	1	
Potamogeton	4	
Ruppia	1	
Leiostigma	1	
Triglochin	1—	12
Hæmodoraceæ.		
Hæmodorum		3
Dioscoreæ.		
Dioscorea		1
Smilacinæ.		
Smilax	1	
Ripogonum	1—	2
Melanthaceæ.		
Anguillaria	1	
Kreysigia	1—	2
Pontederiaceæ.		
Limnostachys		1
Liliaceæ.		
Bulbine	2	
Dichopogon	1	

Liliaceæ (continued).		SP.
Chlorophytum	1	
Cæsia	3	
Tricoryne	1	
Dianella	3	
Cordyline	1	
Asparagus	1	
Eustrephus	2	
Geitonoplesium	2	
Thysanotus	2	
Sowerbæa	1	
Xanthorrhœa	2—	22
Hypoxideæ.		
Hypoxis		1
Aphyllantheæ.		
Laxmannia		1
Commelyneæ.		
Commelyna	4	
Aneilema	5	
Cyanotis	1	
Cartonema	1—	11
Taccaceæ.		
Tacca		1
Aroideæ.		
Arum	1	
Typhonium	1	
Caladium	1—	3
Orontiaceæ.		
Gymnostachys	1	
Pothos	1—	2
Pistiaceæ.		
Lemna		1
Typhaceæ.		
Typha	1	
Sparganium	1—	2
Pandaneæ.		
Pandanus		3
Palmæ.		
Livistona	2	
Seaforthia	1	
Calamus	1—	4

MONOCOTYLEDONEÆ (*continued*).

Xyrideæ.	SP.	
Xyris		5
Eriocauleæ.		
Eriocaulon		4
Desvauxieæ.		
Desvauxia		2
Xerotideæ.		
Xerotes		4
Flagellarieæ.		
Flagellaria		1
Junceæ.		
Juncus		5
Restiaceæ.		
Restio	3	
Lepyrodia	1	
Calorophus	1—	5
Cyperoideæ.		
Cyperus	14	
Kyllingia	1	
Hypælyptum	1	
Fuirena	2	
Chondrachne	1	
Chorizandra	1	
Isolepis	5	
Scirpus	4	
Heleocharis	6	
Fimbristylis	24	
Rhynchospora	1	
Schœnus	3	
Chætospora	1	
Lepidosperma	2	
Cladium	5	
Gahnia	1	
Psittacoschœnus	1	
Caustis	1	
Scleria	2	
Carex	6—	82
Gramineæ.		
Sporobolus	2	
Cinna	1	

Gramineæ (continued).	SP.	
Agrostis	1	
Perotis	1	
Aristida	4	
Stipa	1	
Amphipogon	1	
Danthonia	1	
Bromus	1	
Glyceria	1	
Vulpia	1	
Poa	2	
Eragrostis	3	
Triodia	3	
Phragmites	1	
Eriachne	5	
Pappophorum	2	
Triraphis	2	
Ectrosia	2	
Dactyloctenium	1	
Chloris	3	
Cynodon	2	
Paspalum	1	
Panicum	25	
Oplismenus	1	
Setaria	3	
Cenchrus	2	
Lappago	1	
Neurachne	1	
Isachne	1	
Xerochloa	2	
Spinifex	2	
Anthistiria	6	
Andropogon	16	
Erianthus	2	
Imperata	1	
Ischæmum	4	
Rottboellia	3	
Ophiurus	1	
Hemarthria	1	
Zoysia	1	
Microlæna	1	
Oryza	1	
Leersia	1—	118

ACOTYLEDONEÆ.

Polypodiaceæ.	SP.
Acrostichum	2
Platycerium	2
Campyloneuron	1
Gymnogramme	1
Notochlæna	2
Polypodium	7
Cheilanthes	2
Adiantum	2
Pteris	5
Blechnum	1
Lomaria	1
Asplenium	4
Doodia	2
Nephrodium	4
Aspidium	1
Lindsæa	1
Davallia	1
Dicksonia	2
Ceratopteris	1

Polypodiaceæ (continued).	SP.	
Gleichenia	4	
Platyzoma	1	
Schizæa	1	
Lygodium	1—	49
Lycopodiaceæ.		
Psilotum	1	
Tmesipteris	1	
Lycopodium	5—	7
Marsileaceæ.		
Marsilea	1	
Azolla	1—	2
Ophioglosseæ.		
Ophioglossum	3	
Botrychium	1—	4
Characeæ.		
Chara	3	
Nitella	3—	6

Præcursores ad Floram Indicam. By J. D. HOOKER, Esq., M.D., F.R.S. & L.S., and T. THOMSON, Esq., M.D., F.R.S. & L.S.

(Continued from page 103 of this volume.)

Nat. Ord. CAPRIFOLIACEÆ.

BESIDES the many well-known points of close affinity between *Caprifoliaceæ* and *Rubiaceæ*, an examination of the Indian plants of the former Order enables us to add one which has generally been supposed to present a good distinguishing character between them, namely the large stipules present in two genuine species of *Lonicera* itself. In *Sambucus* the leaves are sometimes described as stipulate, an appearance due in the Indian species to a pair of reduced basal pinnules.

The structure of the ovules in this Order is similar in many respects to that of *Corneæ*, and is the same as in many *Rubiaceæ*. These, in the very earliest stage of *Viburnum Tinus*, consist of a minute mamillary curved nucleus encircled with an annulus, which is the only integument; this annulus is no further developed, but as the ovule grows to maturity, it continues unchanged at its apex. The fully-developed ovule hence has no apparent integuments; that represented by the annulus, being the one which answers to the inner (secundine) in more highly-developed ovules, is in *Viburnum*, congenitally adnate with the nucleus. In *Viburnum* the ovary is generally 1-celled, in *V. Tinus* 2-celled, and the solitary pendulous ovule hangs transversely, so that the raphe is neither turned towards the placental axis, nor diametrically away from it. The testa is formed of the walls of the nucleus and its adherent integument. The cavity of the ovary is full of stellate hairs. The three stigmas are free in a very early stage, and the ovule is developed in one of them above the plane passing through the base of the calyx-lobes. The three stigmas hence probably represent as many free ovaries which afterwards combine, and the developed cells are produced downwards forming cavities in the peduncle.

(Conspectus Generum.)

A. LONICEREÆ. Corollæ *tubus elongatus.* Stylus *filiformis.* Rhaphe *extrorsa.*

1. LONICERA, *Desf.* *Calycis* limbus 5-dentatus. *Corolla* tubulosa. *Stamina* 5. *Ovarium* 2–3-loculare; ovulis plurimis, pendulis. *Bacca* carnosa, oligo- v. poly-sperma, 2–3-locularis, v. septis obliteratis 1-locularis.—Frutices *v.* suffruticuli *erecti v. scandentes*; foliis *in paucis stipulatis.*

2. LEYCESTERIA, *Wall.* *Calycis* limbus 5-lobus, lobis linearibus. *Corolla* infundibuliformis. *Stamina* 5. *Ovarium* 5-loculare; ovulis perplurimis, pendulis. *Bacca* carnosa, 5-locularis, polysperma.—Frutex *erectus*; caule *ramoso, fistuloso*; foliis junioribus *sæpe lobatis*; floribus *bracteatis*; bracteis *amplis.*

3. TRIOSTEUM, *L.* *Calycis* limbus 5-lobus, lobis foliaceis. *Corolla* tubulosa. *Stamina* 5. *Ovarium* 3–5-loculare; ovulis solitariis pendulis. *Bacca* coriacea.—Suffruticuli; foliis *basi subconnatis connatisve.*

4. ABELIA, *Br.* *Calycis* tubus compressus; limbus 5-partitus, lobis foliaceis. *Corolla* infundibuliformis. *Stamina* 4. *Ovarium* 3-loculare; loculis duobus pluri-ovulatis, ovulis abortientibus; tertio 1-ovulato fertili. *Bacca* coriacea, 1-sperma.—Frutices *debiles*; foliis *crenatis*; floribus *involucratis.*

5. DICHILANTHE, *Thwaites.* *Calycis* limbus breviter tubulosus, intus 5-squamatus, 5-partitus. *Corolla* infundibuliformis, curva, ore bilabiato, labio superiore 2-dentato, inferiore 3-dentato. *Stamina* 5. *Ovarium* 2-loculare; ovulis solitariis, pendulis.—Arbor; ramulis *teretibus, ad nodos gemmiferis*; foliis *lanceolatis, coriaceis, integerrimis*; floribus *terminalibus, sessilibus, confertis.*

B. Sambuceæ. Corolla *rotata v. breviter tubulosa.* Stigmata 3, *sessilia.* Rhaphe *introrsa v. lateralis.*

6. Viburnum, *L.* *Calycis* limbus parvus, 5-dentatus. *Corolla* rotata v. breviter infundibuliformis v. tubulosa. *Stamina* 5. *Ovarium* 1-, rarius 2–3-loculare; ovulis solitariis, pendulis. *Bacca* abortu 1-locularis, 1-sperma.—Frutices *erecti*; foliis *simplicibus, integris*; floribus *corymbosis.*

7. Sambucus, *Tourn.* *Calycis* limbus 5-dentatus v. obsoletus. *Corolla* rotata. *Stamina* 5. *Ovarium* 3–5-loculare; ovulis solitariis, pendulis. *Bacca* 3–5-pyrena.—Suffrutices *v.* Herbæ; foliis *impari-pinnatisectis, basi spurie 2-stipulatis v. 2-glandulosis*; floribus *corymbosis.*

I. Lonicera, *L.*

§ A. Stipulatæ. *Stipulæ* interpetiolares magnæ.

1. Lonicera stipulata (*Hf. & T.*). Ramis foliis stipulisque subtus inflorescentiaque dense lanuginosis, stipulis orbiculatis reflexis, foliis distichis oblique ovato-lanceolatis subserratis, floribus subcapitatis, capitulis axillaribus pedunculatis, baccis polyspermis.

Hab. In Himalaya orientali temperata. Sikkim! alt. 6000–10,000 ped., *J. D. H.* (fl. Mart. Apr.) (v. v.)

Species insignis. *Folia* 4–6 unc. longa, coriacea, supra læte viridia, subrugosa, basi inæqualia. *Stipulæ* ½ unc. latæ, marginibus recurvis. *Flores* erecti, bracteati. *Calycis* lobi lineari-oblongi. *Corolla* ⅔ unc. longa, alba, infundibuliformis, basi subgibbosa, laxe lanata. *Stamina* inclusa. *Bacca* ovoidea, flava.

2. Lonicera glaucophylla (*Hf. & T.*). Glaberrima, ramis gracilibus, foliis distichis breve petiolatis lanceolatis v. ovato-lanceolatis acuminatis sinuato-serratis subtus glaucis puberulis, stipulis orbiculatis reflexis.

Hab. Himalaya orientali temperata. Sikkim! alt. 5000-6000 ped., *J. D. H.* (v. v.)

Folia 3–4 unc. longa, submembranacea; nervis subtus gracilibus. *Flores* ignoti.

§ B. Bracteatæ. Erectæ. *Pedunculi* 2-flori. *Bracteæ* 2, magnæ, membranaceæ v. foliaceæ, orbiculatæ, flores amplectentes.

3. Lonicera hispida (*Pall. ex Willd. MSS.*). Ramis hispido-pilosis, foliis oblongis lineari- v. ovato-oblongis obtusis acutis acuminatisve ciliatis utrinque sparse pilosis, pedunculis robustis deflexis, bracteis amplis membranaceis ciliatis flores fere velantibus, corolla infundibuliformi breviter 5-loba.—*D.C. Prodr.* iii. 338; *Ledeb. Flor. Ross.* ii. 389. *Ic.* t. 212.—*L. bracteata,* Royle, Ill. p. 237. t. 53.

Var. β. *setosa*; ramulis foliisque utrinque setoso-hispidis, foliis basi subcordatis.

Hab. Himalaya alpina interiore, alt. 11,000–14,000 ped. Kunawur! *Munro.* Garwhal! et Kumaon! *Strachey & Winterbottom.* Sikkim! *J. D. H.*—Var. β. Sikkim, alt. 13,000 ped., *J. D. H.* (fl. Jul.) (v. v.)

Distr. Soongaria; Siberia Altaica.

Frutex robustus, 2–4-pedalis. *Rami* paucifoliati, cortice laxo; ramulis interdum flexuosis. *Folia* breve petiolata, 1–2 unc. longa, submembranacea. *Pedunculi* pilosi, foliis breviores. *Bracteæ* (majores quam in stirpe Sibirica) ½–1 unc. longæ, valde concavæ, acutæ, ciliatæ, pubescentes, subplicatæ. *Flores* supra medium exserti, glabri v. pilosi. *Corolla* late tubuloso-infundibuliformis, basi gibba. *Bracteolæ* minimæ. *Fructus* ovoideus; seminibus plurimis, singula serie sub 8.

4. LONICERA GLAUCA (*Hf. & T.*). Fruticulus ramosus glaber, foliis (½–⅔ pollicaribus) lineari-oblongis obtusis marginibus scaberulis recurvis subtus glaucis, pedunculis brevibus, bracteis late ovato-oblongis ciliatis, corolla longe tubulosa tubo gracili, ovariis liberis.

Hab. In Himalaya interiore occidentali et Tibetia alpina, alt. 13,000–16,000 ped. Kumaon! et Garwhal! *Strachey & Winterbottom.* Zanskar! Piti! Nubra! *T. Thomson.* (fl. Jul.) (v. v.)

Fruticulus humilis. *Rami* glauci, virgati, cortice laxo. *Flores* foliis æquilongi. *Corolla* bracteis duplo longior, glabra v. pilosula. *Bracteæ* basi connatæ v. liberæ, ½ unc. longæ; bracteolis inconspicuis. *Baccæ* globosæ, seminibus majusculis.

5. LONICERA ASPERIFOLIA (*Hf. & T.*). Frutex ramosus, ramulis puberulis, foliis ovato-oblongis cordatisve subacutis ciliatis superne glabratis subtus glaucis pubescentibusque marginibus tenuiter recurvis et demum crispatulis, pedunculis brevissimis, bracteis late oblongis obtusis, corolla longe tubulosa, ovariis liberis.—*Xylosteum asperifolium,* Decaisne in Plant. Jacquem. 77. t. 85.

Hab. In Himalaya et Tibetia occidentali temperata et subalpina, alt. 10,000–14,000 ped. Gugi! *Strachey & Winterbottom.* Kunawur, *Jacquemont.* Zanskar! et Kashmir! *T. Thomson.* (fl. Jun. Jul.) (v. v.)

L. glaucæ affinis, sed omnibus partibus major, et foliis latioribus subtus pubescentibus. *Ramuli* interdum sparse setosi. *Folia* juniora basi rotundata, seniora latiora, basi cordata; *petioli* graciles, ¼ unc. longi. *Corollæ* pilosæ tubus lobis triplo longior. *Bracteolæ* 0. *Baccæ* ovoideæ; seminibus paucis magnis.

§ C. ERECTÆ. *Pedunculi* 2-flori. *Bracteæ* setaceæ v. foliaceæ, flores non amplectentes.

† Corollæ *limbus non-bilabiatus.* Bracteolæ *magnæ, plerumque connatæ et ovaria cingentes* (*in* L. obovata *parvæ*).

6. LONICERA LIGUSTRINA (*Wall. in Roxb. Fl. Ind.* ii. 179). Arbuscula, ramulis pubescentibus, foliis lanceolatis obtuse acuminatis mar-

ginibus costaque ciliolatis glaberrimisve, pedunculis brevibus, bracteis setaceis, ovariis liberis bracteolis connatis semicinctis, corollæ tubo gracili supra basin gibboso.—*D.C. Prodr.* iv. 334; *Wight, Ill.* iii. 1025.

Hab. Himalaya centrali subtropica. Nipal, alt. 4000 ped.! *Wallich.* Montibus Khasia, alt. 4000–6000 ped.! *Simons,* &c. Montibus Nilgherrie, *Wight,* &c. (fl. Mart. Apr.) (v. v.)

Arbuscula 10–15-pedalis, foliosa. *Folia* breve petiolata, 1–3 unc. longa, venosa, plana, subnitida. *Pedunculi* $\frac{1}{10}$–$\frac{1}{3}$ unc. longi, pubescentes. *Corolla* $\frac{1}{2}$ unc. longa, glabra v. pilosa. *Bacca* globosa; seminibus 2–4, magnis.

7. LONICERA TOMENTELLA (*Hf. & T.*). Ramulis foliis subtus pedunculisque tomentosis, foliis ($\frac{3}{4}$–1 poll.) lineari-oblongis lanceolatisve obtusis acutisve, pedunculis breviusculis, bracteis foliaceis lineari-oblongis, bracteolis in cupulam connatis, ovariis glaberrimis ovoideis, calycis limbo brevi lobis obtusis, corolla basi subæquali pilosula, genitalibus inclusis.

Hab. Himalaya orientali temperata. Sikkim, alt. 8000–12,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Frutex 10–12-pedalis; ramulis distichis, strictis. *Folia* opaca. *Bracteæ* $\frac{1}{4}$–$\frac{3}{4}$ unc. longæ. *Ovaria* libera v. connata. *Corolla* alba, vix $\frac{1}{2}$ unc. longa, ore æquali, lobis brevibus, fauce villosa. *Baccæ* atræ, magnit. pisi; seminibus parvis, numerosissimis.

8. LONICERA SERICEA (*Royle, Herb.*). Ramulis novellis foliisque subtus præcipue sericeis, foliis (1–1$\frac{1}{2}$ poll.) lineari-obovatis oblongo-lanceolatisve obtusis, axillis nervorum subtus tomentellis, pedunculis gracilibus, bracteis linearibus, bracteolis in cupulam connatis, calycis limbo cupulari truncato, corolla pubescenti-pilosa basi gibba breviter 5-loba ore æquali.

Hab. Himalaya temperata. Kumaon?! *Hb. Royle.* Sikkim, alt. 11,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Arbuscula gracilis, ramulis strictis demum glabris. *Folia* sublonge petiolata. *Pedunculi* fructus filiformes, glabri. *Flores* sericei. *Ovaria* glabra, distincta v. connata. *Baccæ* parvæ, atræ. *Semina* numerosa, oblonga.—Descriptio ex exemplaribus floriferis Royleanis, et fructiferis Sikkimensibus in quibus bracteolæ delapsæ sunt (an nullæ?).

9. LONICERA ANGUSTIFOLIA (*Wall. Cat.* no. 480). Glaberrima v. foliis ramulisque junioribus pilosulis, foliis (pollicaribus) lanceolatis oblongo-lanceolatisve acutis acuminatisve subtus pallidis, pedunculis gracilibus, bracteis linearibus foliaceisve, bracteolis in cupulam connatis, corolla basi æquali glabra breviter 5-fida ore æquali fauce villosa.—*D.C. Prodr.* iv. 337; *Journ. Hort. Soc. Lond.* iii. 238.

Hab. Himalaya temperata, a Sikkim! alt. 10,000–12,000 ped., *J. D. H.,* ad Kashmir! 6000–10,000 ped., *T. T.* (fl. Mai. Jun.) (v. v).

Frutex 6–12-pedalis; ramulis gracilibus. *Folia* seniora utrinque glaberrima, latitudine varia, plerumque lanceolata, interdum oblongo- v.

obovato-lanceolata. *Pedunculi* ½–1 unc. longi. *Bracteæ* sæpissime foliaceæ, ¼–⅓ unc. longæ. *Ovaria* sæpius bracteolis immersa. *Calycis* lobi obtusiusculi. *Corolla* vix ½ unc. longa, alba v. pallide rosea, odora. *Bacca* magnit. pisi. *Semina* pauca, 1–6.

10. LONICERA RUPICOLA (*Hf. & T.*). Rigida, ramulis puberulis, foliis (½–¾ poll.) lineari-oblongis subacutis marginibus recurvis subtus niveo-tomentosis, pedunculis brevibus, bracteis linearibus foliaceis subtus albo-tomentosis, bracteolis discretis ovaria subæquantibus, calycis lobis elongatis pilosis, corolla glabrata basi æquali, genitalibus inclusis.

Hab. In Tibetia orientali et centrali alpina. Gugi, alt. 13,500 ped.! *Strachey & Winterbottom*, et in Tibetia Sikkimensi, alt. 15,000–17,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Fruticulus rigidus, 2–4-pedalis. *Folia* coriacea, supra reticulatim venulosa. *Flores* ½ unc. longi. *Calycis* lobi lanceolati, in tubum brevem connati. *Corollæ* tubus subcylindricus, ore æquali, lobis patentibus lineari-oblongis.

11. LONICERA SPINOSA (*Jacquem. MSS.*). Glaberrima, rigida, ramis lignosis, ramulis spinescentibus, foliis lineari-oblongis marginibus obtusis recurvis, pedunculis brevissimis, bracteis foliaceis linearibus marginibus recurvis, bracteolis in cupulam connatis, calycis limbo cupulari lobis ovatis acutis, corollæ tubo gracili basi æquali lobis inæqualibus, genitalibus exsertis.—*L. linearis*, Hb. Royle.—*Xylosteum spinosum*, Decaisne, Plant. Jacquem. 78. t. 86.

Hab. In Himalaya interiore alpina et temperata. Kunawur, 11,000–12,000 ped.! *Jacquemont*; *T. T.* Garwhal, 11,500 ped.! *Strachey & Winterbottom.* In Tibetia occidentali, alt. 12,000–15,000 ped.! *T. T.*, et orientali, alt. 15,000–17,000 ped.! *J. D. H.* (fl. Jul.) (v. v.)

Fruticulus rigidus, totus glaberrimus, cortice pallido v. albo. *Folia* sparsa, parva, coriacea. *Flores* ramulis abbreviatis aggregati, pro planta magni. *Corolla* ½–¾ unc. longa, tubo quam in affinibus longiore et graciliore.

12. LONICERA MYRTILLUS (*Hf. & T.*). Ramulis puberulis, foliis (⅓–½ poll.) elliptico- v. obovato-oblongis obtusis subtus glaucis, pedunculis brevissimis elongatisve, bracteis foliaceis lineari-oblongis, bracteolis in cupulam connatis, corolla campanulata basi æquali, lobis brevibus subæqualibus fauce pilosa, genitalibus inclusis.

Hab. Himalaya temperata et alpina. Marri, 9000 ped.! *Fleming.* Kishtwar, 8000–12,000 ped.! *T. Thomson.* Kunawur! *Lance.* Sikkim, 11,000–14,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Fruticulus parvus, sæpius depressus, ramis prostratis. *Folia* breve petiolata, glaberrima, basi acuta, supra luride viridia. *Flores* breves. *Corolla* latiuscula, sub ⅓ unc. longa. *Baccæ* parvæ; semina pauca, sub 4.

13. *Lonicera parvifolia* Edgew. in Wall. Cat. 9058, non Bunge; Edgew. in Linn. Trans. xx. p. 60.

Hab. In Himalaya temperata et alpina. Kunawur, alt. 11,000–13,000 ped.! *T. T.* Kumaon, alt. 12,000 ped.! *Blinkworth, Strachey & Winterbottom.* Sikkim, alt. 12,000–14,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Omnia sicut *L. Myrtillus* nisi bracteæ latiores et foliaceæ.

14. LONICERA PURPURASCENS (*Hf. & T.*). Ramulis pubescentibus, foliis ovatis oblongisve obtusis basi rotundatis truncatisve utrinque pubescentibus, pedunculis gracilibus folio brevioribus, bracteis linearibus arcuatis ciliatis tenuissime glandulosis, bracteolis rotundis connatis submembranaceis glabris, calyce cyathiformi brevissimo subintegro marginibus reflexis, corolla basi gibba puberula ore æquali breviter 5-fido.—*Xylosteum purpurascens,* Jacquem. MSS.; Decaisne in Plant. Jacquem. 79. t. 87.

Hab. Himalaya occidentali temperata. Kashmir, *Jacquemont.* (fl. Jun.)

L. parvifoliæ affine, differt foliis majoribus, corolla pilosa, bacca 4-sperma, et calyce pateræformi reflexa.

15. *Lonicera obovata* (Herb. Royle).

Hab. Himalaya occidentali temperata et subalpina. Kishtwar! et Kunawur! alt. 8000–13,000 ped., *T. T.* Kumaon, alt. 12,500 ped.! *Strachey & Winterbottom.* Sikkim, alt. 11,000–14,000 ped.! *J. D. H.* (fl. Jun.) (v. v.)

Omnia *L. parvifoliæ,* sed bracteæ lineari-subulatæ, bracteolæ parvæ, corollæ tubus gracilior basi valde gibbosus, et genitalia exserta. Ab *L. microphylla* differt forma corollæ, et bracteolis parvis.

†† Corolla *bilabiata.*

a. Bracteolæ magnæ plerumque connatæ.

16. LONICERA QUINQUE-LOCULARIS (*Hardwick in As. Res.* vi. 351; *Wall. in Roxb. Fl. Ind.* ii. 174). Ramulis puberulis, foliis (1–2 poll.) oblongis ellipticis ovato-cordatisve puberulis, pedunculis brevissimis, bracteis minimis setaceis, bracteolis in cupulam ciliatam connatis, corollis pubescenti-pilosis basi æqualibus profunde bilabiatis labio superiore breviter 4-lobo inferiore lineari-oblongo.—*L. diversifolia,* Wall. in Roxb. Flor. Ind. ii. 178; Hook. Ic. Plant. t. 807; Lindley in Bot. Reg. xxx. t. 33.—*L. Royleana,* Wall. Cat. 478.

Hab. In Himalaya occidentali temperata, alt. 5000–11,000 ped. A Kumaon! *Blinkworth,* ad Kashmir! *T. Thomson.* Necnon in Bhotan! *Griffith.* (fl. Jun.) (v. v.)

L. incanæ, Decaisne (*persica,* Jaub. & Sp. et? *L. Kurdistana,* Boiss.) proxima, differt solummodo bracteolis cupulæformibus

Folia et *ramuli* plus minusve pubescentes v. subvelutini. *Folia* utrinque acuta v. obtusa v. basi interdum cordata, seniora interdum remote sinuato-dentata. *Calycis* limbus cupularis, 5-fidus. *Ovaria* plerumque libera. *Filamenta* pilosa. *Baccæ* magnit. pisi, sessiles, quaternæ. *Semina* 8–10, atra.

17. **Lonicera hypoleuca** (*Decaisne, Plant. Jacquem.* 81. t. 89). Ramulis pubescenti-pilosis glandulosisve, foliis ($\frac{2}{3}$–1$\frac{1}{3}$ poll.) oblongis cordato-rotundatisve obtusis puberulis subtus glaucis, pedunculis $\frac{1}{3}$–$\frac{1}{2}$ unc. longis, bracteis subfoliaceis lineari-oblongis, bracteolis glanduloso-hispidulis in cupulam connatis, corollis glanduloso-pilosis basi gibbis ad medium bilabiatis.—Cf. *L. aurea* (Aucher-Eloi, 4340), quæ differt ramulis glabris.

Hab. Himalaya occidentali temperata, alt. 8000–10,000 ped. Kunawur et Piti! *Jacquemont*, &c. Garwhal! *Strachey & Winterbottom.* (fl. Jun.) (v. v.)

Fruticulus depressus. *Folia* breve petiolata. *Pedunculi* stricti. *Bracteæ* sub $\frac{1}{4}$ unc. longæ. *Ovaria* plerumque in unum connata. *Calycis* lobi parvi. *Corolla* sub $\frac{1}{2}$ unc. longa. *Filamenta* glabra. *Baccæ* parvæ, bracteolis semi-immersæ.

18. **Lonicera decipiens** (*Hf. & T.*). Ramulis gracilibus, foliis (1$\frac{1}{2}$–2-pollicaribus) ovatis oblongisve acuminatis membranaceis glabris, pedunculis elongatis puberulis, bracteis minimis setaceis, bracteolis orbiculatis ovaria discreta æquantibus, corolla bilabiata basi gibba breviter campanulata, stylo hirsuto.

Hab. In Himalaya orientali temperata. Sikkim, alt. 10,000–12,000 ped.! *J.D.H.* (fl. Jul.) (v. v.)

L. Tataricæ, L. valde affinis et simillima; differt bracteolis magnis, calycisque dentibus brevioribus.—*Frutex* 10–15-pedalis. *Flores* glabrati, vix $\frac{1}{2}$ unc. longi. *Corollæ* faux pilosa. *Stylus* villosus. *Baccæ* diametr. pisi, rubræ demum nigræ. *Semina* sub 8.

β. *Bracteolæ* parvæ v. nullæ (vid. *L. obovata* in subsectione priore).

19. **Lonicera orientalis** (*Lam. Dict.* i. 731). Tota glaberrima, foliis membranaceis (2–4 poll.) ovatis ellipticis ovato-lanceolatisve acuminatis nervis tenuibus, pedunculis gracilibus, bracteis parvis subulatis setaceisve, bracteolis minimis orbiculatis, corolla brevi basi subgibba profunde bilabiata, filamentis styloque sericeis.—*D.C. Prodr.* iv. 337; *Jaub. & Spach, Illust.* t. 71.—L. Govaniana, *Wall. Cat.* No. 481; *D.C. Prodr.* iv. 337.

Hab. Himalaya occidentali temperata, alt. 6000–10,000 ped.; a Kumaon! *Blinkworth*, ad Kashmir! *T. Thomson.* (fl. Jun.) (v. v.)

Distr. Caucasus, Iberia.

Frutex gracilis, omnino glaber, nisi secus nervos foliorum subtus, filamenta stylusque. *Petioli* subgraciles. *Pedunculi* $\frac{1}{2}$–1 poll. longi. *Ovaria* sæpissime in fructum pyriformem connata. *Calycis* lobi subulati. *Corolla* $\frac{1}{3}$ unc. longa. *Baccæ* nigræ.

20. **Lonicera heterophylla** (*Decaisne, Plant. Jacquem.* 30. t. 38). Ramulis glaberrimis, foliis obovatis v. elliptico-lanceolatis acutis acuminatisve basi attenuatis integris sinuato-lobatisve ciliatis, petiolis tenuissime glandulosis, pedunculis elongatis folio brevioribus, bracteis

lineari-subulatis, bracteolis minimis, calycis limbo obsoleto, corolla hispidula bilabiata basi gibba.

Hab. Himalaya occidentali temperata; Kunawar ad Choupienne, alt. 6000–7000 ped., *Jacquemont*. (fl. Jun.)

Proxime affinis videtur *L. orientali,* et verosimiliter varietas.

21. Lonicera microphylla (*Willd. in Rœm. & Sch. Syst.* v. 258). Glaberrima v. pilosula, foliis plerumque in ramulos breves fasciculatis (⅔–1 poll.) obovatis oblongisve obtusis, pedunculis gracilibus, bracteis setaceis, bracteolis 0, calycis limbo truncato, corolla glaberrima tubo gracili basi gibbo supra medium dilatato bilabiato.—*D.C. Prodr.* iv. 336; *Led. Flor. Ross.* n. 213.

Hab. In Tibetia occidentali temperata; alt. 11,000–14,000 ped.! *T. Thomson.* (fl. Jun.) (v. v.)

Distr. Altai, Soongaria.

Fruticulus parvus, habitu *L. parvifoliæ. Folia* forma varia, plerumque obovata, rarius lineari-oblonga, subtus pallida sed vix glauca. *Pedunculi* ½–1 unc. longi. *Corolla* ½ unc. longa. *Filamenta* glabra. *Ovaria* discreta v. connata. *Baccæ* parvæ; seminibus sub 6.

22. Lonicera discolor (*Lindl. in Bot. Reg.* 1844, sub t. 33, et vol. xxxiii. 1847, t. 44). Glaberrima, foliis (1½–2 poll.) late oblongis ellipticisve obtusis membranaceis nervis tenuibus, junioribus acutis sparse puberulis, pedunculis gracilibus, bracteis setaceis, bracteolis minimis, calycis limbo cupulari truncato, corolla brevi pilosa basi lata gibba infra medium bilabiata.

Hab. Himalaya occidentali temperata, alt. 9000–10,000 ped. Kashmir! et Kishtwar! *T. Thomson.* (fl. Jun.) (v. v.)

L. orientali simillima, sed calycis lobi fere obsoleti corollaque brevior pilosa.

23. Lonicera alpigena (*L. Sp. Pl.*). Sparse glanduloso-pilosula, foliis (2–4 poll.) ovato-lanceolatis attenuato-acuminatis membranaceis basi rotundatis cordatisve, pedunculis elongatis pilosis, bracteis parvis subulatis, bracteolis minimis ovatis, calycis limbo breviter lobato, corolla basi gibba glanduloso-pubescenti bilabiata labio superiore breviter lobato, stylo sericeo.—*L. Webbiana,* Wall. Cat. No. 476; D.C. Prodr. iv. 336.—*L. oxyphylla,* Edgew. in Linn. Trans. xx. p. 60.

Hab. Himalaya temperata, alt. 8000–10;000 ped., a Kumaon! *Blinkworth, Strachey & Winterbottom,* ad Marri! *Fleming,* et in Bhotan! *Griffith.* (fl. Jun.) (v. v.)

Distr. Alpibus Europæ centralis.

Affinis *L. orientali,* sed glanduloso-pubescens, foliis majoribus, longe acuminatis, corollisque glandulosis. A *L. discolor* differt foliis.

§ D. Scandentes. *Corolla* bilabiata.

24. Lonicera Japonica (*Thunb. Jap.* 89, *fid. Wall. Cat.* 473). Ramulis petiolis pedunculisque patentim pilosis, foliis breve petiolatis

ovato-lanceolatis acuminatis basi cordatis ciliatis subtus crebre reticulatim venosis tomentosis, floribus axillaribus solitariis v. ramulis axillaribus capitatis v. in spicas terminales dispositis, bracteis brevibus bracteolisque parvis ciliatis, ovario glabro, corolla longissima ($1\frac{1}{2}$ poll.) hirsuta.—*Wall. in Roxb. Fl. Ind.* ii. 174; *And. Bot. Rep.* ix. 583 (*fid. Wall.*); *Bot. Reg.* i. t. 70.—*L. macrantha,* D.C. Prodr. iv. 333.—*Caprifolium macranthum,* Don, Prodr. 140.—*L. confusa,* D.C. *l. c.*—*L. hirtiflora,* Champion.

Hab. Himalaya centrali et orientali, alt. 6000–9000 ped. Nipal! *Wallich.* Sikkim! *J. D. H.* Mont. Khasia! *Griffith, Masters.* (fl. Mai.) (v. v.)

Distr. Japan; China!

Var. *β.* Ramis gracilioribus, foliis subtus glaucis, floribus brevioribus.

Hab. Montibus Khasia, alt. 5000–6000 ped.! *Da Mack*; *J. D. H. & T. T.* (fl. Jun.) (v. v.)

Rami robusti, ramuli stricti. *Folia* 2–3 unc. longa, coriacea, supra glabra, subtus pallidiora interdum velutina. *Flores* flavi, vix odori.

Obs. *L. longiflora,* D.C. Prodr. iv. 331, *Caprifol. longiflorum,* Sabine MSS. in Lindl. Bot. Reg. t. 1232 (Nepaliæ incola?), est glaberrima, et verosimiliter planta Chinensis.

25. Lonicera glabrata (*Wall. Cat.* 474, *et in Roxb. Fl. Ind.* ii. 175). Ramulis glabris pubescentibusve, foliis ovato-cordatis ovato-oblongisve acuminatis subtus glabris puberulisve, floribus versus apices ramulorum axillarium breviter racemosis, bracteis brevissimis subulatis, bracteolis minimis, corolla ($\frac{1}{2}$ poll.) glaberrima tubo infundibuliformi.—*D.C. Prodr.* iv. 334.—*L. ovata,* Herb. Ham. Wall. Cat. 6300.

Var. *β.* Ramulis foliisque oblongo-lanceolatis subtus tomentosis.

Hab. Himalaya centrali et orientali temperata, alt. 5000–7000 ped. Nepal! *Wallich.* Sikkim! *J. D. H.* Assam (Montibus Khasia?), *Masters.* (fl. Oct.–Dec.) (v. v.)—Var. *β.* Bhótan! *Griffith.*

L. Japonicæ affinis, differt foliis non ciliatis, plerumque latioribus et subtus glaberrimis, ramulis non patentim pilosis, calyce breviore, et corolla multo minore tubo breviore glaberrima.

26. Lonicera Loureirii (*D.C. Prodr.* iv. 334). Ramulis pubescentibus junioribus hirsutis villosisve, foliis oblongo-lanceolatis longe acuminatis basi rotundatis cordatisve ciliatis subtus pubescenti-pilosis glabratisve, pedunculis robustis axillaribus et ad apices ramulorum fasciculatis bifloris, bracteis linearibus elongatis interdum foliaceis, corollæ ($\frac{1}{2}$ poll.) pilosæ tubo infundibuliformi lobis breviusculis.—*Hook. Ic. Plant.* 806 (est forma foliis brevioribus).—*L. acuminata,* Wall. Cat. 472, et in Roxb. Fl. Ind. ii. 176; D.C. Prodr. iv. 334.—*Xylosteum Loureirii,* Bl. Bijd. 653.

Hab. Himalaya centrali et orientali, alt. 7000–11,000 ped. Nepal! *Wallich*; *J. D. H.* Sikkim! *J. D. H.* (fl. Aug.–Oct.) (v. v.)

Distr. Java.

Planta variabilis, præcipue indumento; ab affinibus (sequente excepto) distinguitur bracteis fructu æquilongis v. longioribus interdum foliaceis.

27. LONICERA LESCHENAULTII (*Wall. Cat. No.* 471, *et in Roxb. Fl. Ind.* ii. 178). Tota nisi in pagina superiore foliorum cano-pubescens v. cano-tomentosa, foliis ovato-cordatis ovatisve acuminatis, pedunculis axillaribus v. in fasciculos racemosve terminales dispositis, ovariis canis, bracteis linearibus, corollæ tubo (1–1½ poll.) gracili.—*Wight, Ill.* ii. 72. t. 120 et 121 B; *Wight & Arn. Prodr.* 389.—*L. mollis,* Wight, Ill. ii. 71; Wall. Cat. 6301.

Hab. Montibus Malabariæ, alt. 5000–7000 ped. frequens! *Leschenault*, &c. (fl. Jan.–Mar.)

Facile distinguitur foliis latis, pube v. tomento cano, ovariis canis, bracteis elongatis, tuboque corollæ gracili.

28. LONICERA GRIFFITHII (*Hf. & T.*). Glaberrima, foliis gracile petiolatis ovatis oblongis orbiculatisve obtusis, floribus in capitula terminalia dispositis, pedunculis calycibus bracteisque parvis pilosis, corolla (⅔ poll.) glanduloso-pilosa tubo infundibuliformi.

Hab. Affghanistan! *Griffith.*

L. Etruscæ proxima, differt foliis supremis non connatis.—*Folia* 1–1½ unc. longa, interdum fere latiora quam longa, in eodem ramulo forma varia, inferiora angustiora, suprema interdum cordata. *Calyx* longe ciliatus.

Quid *Lonicera,* Affghanistan, Griff. 751? (folia tantum).

L. lanceolata, Wall. in Roxb. Fl. Ind. ii. 177; D.C.? et Wall. Cat. No. 475; in Herb. Linn. Soc. (ubi corolla deest); D.C. Prodr. iv. 334?

L. bicolor, Kl. in Prinz Waldem. Him. 71 (fid. Pritzel, Icon. Bot.)?

L. macrogyne, Kl. in Prinz Waldem. Him. 72?

II. LEYCESTERIA, *Wall.*

1. *Leycesteria formosa,* Wall. in Roxb. Flor. Ind. ii. 181. Cat. No. 470; D.C. Prodr. iv. 338; Wight, Ill. ii. 72. t. 121 D.

Hab. Himalaya temperata, alt. 5000–10,000 ped. frequens; a Simla! *Comta. Dalhousie,* ad Sikkim! *J. D. H.,* et Montibus Khasia, alt. 5000–6000 ped., *J. D. H. & T. T.* (fl. Jun.–Aug.) (v. v.)

Rami fistulosi. *Petioli* basi mediante linea elevata crassa stipulari juncti. *Folia* juniora sæpissime lobata, et serrata. *Bacca* septis interdum ab axi solutis. *Gemmæ* foliiferæ iis *Loniceræ* omnino similes.—Genus vix a *Lonicera* distinctum.

III. TRIOSTEUM, *L.*

1. *Triosteum Himalayanum,* Wall. in Roxb. Fl. Ind. ii. 180; D.C. Prodr. iv. 330.

Hab. Himalaya temperata, alt. 10,000–12,000 ped. Kumaon! *Strachey & Winterbottom.* Nipal! *Wallich.* Sikkim! *J. D. H.* (fl. Jul.–Sept.) (v. v.)

Quid *T. hirsutum,* Roxb. Fl. Ind. ii. 180. e Chittagong?

IV. ABELIA, *Br.*

1. *Abelia triflora* (Br. in Wall. Plant. As. Rar. 14. t. 15; D.C. Prodr. iv. 339; Wight, Ill. ii. 72. t. 121 C.

Hab. Himalaya occidentali temperata, alt. 6000–9000 ped.; a Kumaon! *Blinkworth,* ad Marri! *Fleming.* (fl. Jun.–Aug.) (v. v.)

V. DICHILANTHE, *Thw.*

1. *Dichilanthe Zeylanica,* Thwaites in Hook. Kew Journ. Bot. vol. viii. 270 & 376. t. 8 A. (ubi stipulæ delendæ).

Hab. Sylvis tropicis insulæ Ceylon! *Thwaites.*

VI. VIBURNUM, *L.*

A. *Corolla* breviter campanulata, v. infundibuliformis.

1. VIBURNUM COTINIFOLIUM (*Don, Prodr.* 141). Foliis ovatis rotundatisve subintegerrimis subtus albis corymboque subsessili dense stellato-tomentosis, calycis lobis brevissimis.—*D.C. Prodr.* iv. 327; *Wight, Ill.* 72. t. 121 A; *Lindl. Bot. Reg.* xix. t. 1650.—*V. polycarpum,* Wall. Cat. 455; D.C. Prodr. iv. 328.

Var. *α.* Foliis utrinque subvelutino-tomentosis.

Var. *β.* Foliis superne glabris.

Var. *γ.* Foliis ovato-oblongis oblongo-lanceolatisve.

Hab. Himalaya temperata, alt. 7000–9000 ped. Bhotan! *Griffith.* Kumaon! *Blinkworth,* &c. Simla! *Comta. Dalhousie,* &c. (fl. Jun. Jul.) (v. v.)

Ramuli robusti, ad apices tantum foliosi. *Folia* breve crasse petiolata, 3–5 poll. longa, acuta v. obtusa, reticulatim venosa, opaca, integerrima v. crenulata, basi rotundata v. cordata. *Corymbi* rami crassi, ramosi. *Ovarium* glaberrimum. *Bacca* oblonga, $\frac{1}{3}$ unc. longa; endocarpio compresso, utrinque 2-sulcato; stylo brevissimo conico.

B. *Corolla* rotata. *Corymbus* subumbellatus.

2. VIBURNUM CORYLIFOLIUM (*Hf. & T.*). Ramulis petiolis corymbisque breve pedunculatis patentim stellatim tomentosis subvillosisve, foliis late ovato-cordatis acuminatis grosse dentatis utrinque molliter pubescentibus, corymbi radiis elongatis.

Hab. Montibus Khasia, regione temperata, prope Kala-panee, alt. 5000–6000 ped.! *J. D H. & T. T.* (frt. Jun.) (v. v.)

Distr. ? China.

Frutex. *Folia* 2 poll. longa, submembranacea, seniora superne glabrata, nervis parallelis, petiolis brevibus v. elongatis. *Flores* non visi. *Baccæ* parvæ, late ovatæ, acutæ, nitidæ, utrinque sulcatæ, valde compressæ, hinc concavæ.

3. VIBURNUM STELLULATUM (*Wall. Cat.* 463). Foliis ovatis ovato-cordatis lanceolatisve caudato-acuminatis grosse sinuato-dentatis, supra glabris subtus secus nervos sparse stellatim puberulis pilosulisque,

corymbo subsessili decomposito alabastrisque cinereo-pubescentibus. —*D.C. Prodr.* iv. 327; *Wall. Plant. As. Rar.* ii. p. 54. t. 169.—*V. Mullaha,* Ham. in Don, Prodr. 141; D.C. *l. c.*

Hab. In Himalaya centrali et occidentali temperata, alt. 7000–10,000 ped. Nepal! *Wallich.* Kumaon! et Garwhal! *Blinkworth*; *Strachey & Winterbottom.* Simla! *Madden,* &c. (fl. Jul. Aug.) (v. v.)

Ramuli cinerei. *Folia* 3–6 unc. longa, submembranacea, basi cuneata, rotundata v. cordata, supra medium dentata; costa subtus sæpius appresse pilosula. *Corymbus* multiradiatus; flores minimi. *Ovaria* dense pubescentia. *Calycis* lobi oblongi. *Corolla* rotata, extus pubescens. *Stamina* brevia. *Stylus* brevis, subcolumnaris, stigmate capitato. *Bacca* ovato-oblonga, valde compressa, magnitudine varia ($\frac{1}{4}$–$\frac{1}{2}$ unc. longa), nitida; endocarpio longitudinaliter hinc uni-, inde bi-sulcato.

4. *Viburnum involucratum* (Wall. Cat. 458; D.C. Prodr. iv. 327).

Hab. In Himalaya temperata tota, alt. 7000–11,000 ped., frequens a Sikkim! *J. D. H.,* ad Jamu! *T. T.* (fl. Mai.–Jun.) (v. v.)

Omnia *V. stellulati* (cujus verosimiliter varietas est), sed ramis gracilioribus, foliis minoribus interdum fere glaberrimis, corymbisque laxioribus.—Forma a cl. Wallichio lecta cum corymbo foliato certe monstrosa est; in Sikkim haud infrequens.

5. VIBURNUM CORDIFOLIUM (*Wall. Cat.* 462). Foliis ovato-cordatis acuminatis creberrime argute dentatis, nervis subtus petiolis pedunculisque sparse stellato-puberulis, corymbis sessilibus bracteatis radiis elongatis, ovariis glabris.—*D.C. Prodr.* iv. 327.—*V. furcatum,* Bl. in Herb. Hook.

Hab. In Himalaya temperata, alt. 10,000-12,000 ped. Bhotan! *Griffith.* Sikkim! *J. D. H.* Nepal! *Wallich.* Kumaon! *Blinkworth.* (fl. Mai.–Jun.) (v. v.)

Distr. Japan!

Frutex v. arbuscula. *Rami* teretes, glabri. *Folia* terminalia, submembranacea, 3–5 poll. longa, nervis plurimis subparallelis, juniora subtus stellato-tomentosa. *Corymbi* radii interdum bracteolati. *Calycis* lobi stellatim pilosi. *Corolla* late rotata. *Stamina* parva. *Stylus* late conicus. *Stigma* 3-lobum. *Bacca* late ovata, endocarpio utrinque medio sulcato.

6. VIBURNUM FŒTIDUM (*Wall. Cat.* 466; *Plant. As. Rar.* i. p. 49. t. 61). Ramulis petiolis corymbis nervis foliorum subtus pube stellata furfuraceis, foliis elliptico-oblongis basi cuneatis trinerviis grosse sinuato-dentatis serratisve, corymbis pedunculatis, ovariis glabris.—*D.C. Prodr.* iv. 325.

Var. *β. premnacea,* corymbo foliis 3–4 involucrato.—*V. premnaceum,* Wall. Cat. 461; D.C. Prodr. *l. c.*

Hab. Montibus Khasia regione tropica, alt. 3000–5000 ped.! *De Silva,* &c.; Montibus Taong dong Birmæ! *Wallich.* (fl. Jun.) (v. v.)

Frutex 6–10-pedalis. *Rami* foliosi. *Folia* 1–4 unc. longa, obtusa, acuta v. acuminata, interdum integerrima, nervis paucis, ad axillas sæpius tomentellis. *Corymbi* compositi, non ampli, ebracteati v. foliis 1–4 involucrati. *Flores* parvi, bracteolati. *Calycis* lobi late ovati. *Corolla* rotata, tubo brevi. *Stylus* brevis, late conicus. *Bacca* ovata, acuta, nitida, $\frac{1}{4}$ unc. longa, forma *V. mollis.*

7. VIBURNUM LUTESCENS (*Blume, Bijd.* 655). Petiolis corymbisque spurie axillaribus pedunculatis pube stellulata furfuraceis, foliis oblongis ellipticisve crebre grosse serrato-dentatis utrinque glabris, ovariis glaberrimis.—*D.C. Prodr.* iv. 324.—*V. Colebrookianum,* Wall. Cat. 460; D.C. *l. c.*—(*V. Sundaicum,* Miq.)

Hab. In Himalaya orientali tropica. Sikkim, alt. 2000–4000 ped.! *J. D. H.* Assam! Silhet! et Montibus Khasia! alt. 0–4000 ped. frequens! *De Silva,* &c. (fl. Mart. Apr.) (v. v.)

Distr. Insulis Malayanis.

Frutex 6–8-pedalis. *Rami* robusti, foliosi. *Folia* submembranacea, 4–7 poll. longa, nervis subtus interdum sparse puberulis. *Corymbi* longe pedunculati, spurie axillares, *i. e.* in ramulis axillaribus brevissimis inconspicuis terminales. *Flores* parvi, ebracteolati. *Calycis* lobi oblongi, concavi. *Corolla* rotata. *Stamina* brevia. *Baccæ* parvæ, rubræ; endocarpio compresso, utrinque convexo, obscure sulcato.—Ramuli floriferi in exemplaribus Malayanis plerumque evoluti sunt; corymbique dein terminales evadunt.

8. VIBURNUM PUNCTATUM (*Ham. in Don Prodr.* 142). Glaberrimum v. corymbo terminali puberulo, foliis coriaceis ellipticis elliptico-lanceolatisve acuminatis subtus punctulatis, corymbi ramis angulatis floribusque bracteatis, ovariis glaberrimis.—*D.C. Prodr.* iv. 324.—*V. acuminatum,* Wall. Cat. 465; D.C. *l. c.*; Wight & Arn. Prodr. 388; Wight, Icon. t. 1021; Spicileg. t. 89.

Hab. In Himalaya tropica, alt. 1000–5000 ped., a Bhotan! *Griffith,* ad Kumaon! *Strachey & Winterbottom.* Montibus Concan! et Canaræ! *Stocks,* &c., et Malabariæ! *Noton,* &c. (fl. Jan.–Mart.) (v. v.)

Distr. Java.

Frutex orgyalis. *Rami* robusti. *Folia* utrinque acuminata, nervis paucis, subtus subtilissime punctulata. *Corymbus* amplus. *Flores* parvi. *Calycis* lobi oblongi. *Corolla* rotata. *Bacca* majuscula, $\frac{1}{3}$ unc. longa, oblonga, utrinque obtusa, compressa; endocarpio utrinque bisulcato.

9. VIBURNUM INTEGERRIMUM (*Wall. Cat.* 457). Foliis glaberrimis elliptico-oblongis integerrimis abrupte caudato-acuminatis paucinerviis, corymbo terminali pedunculato stellatim pubescente.—(Valde affine *V. sambucino,* Blume.)

Hab. Insula Penang! *Wallich*; *Walker.* (fl. Aug.)

Distr. Java.

V. punctato affine, differt foliis subtus impunctatis, corymbi pedunculo ramisque dense pubescentibus gracilioribus.—*Ramuli* et petioli juniores puberuli. *Flores* parvi.

C. *Corolla* rotata. *Corymbus* paniculatus v. thyrsiformis.

10. VIBURNUM ODORATISSIMUM (*Ker, Bot. Reg.* vi. t. 456). Glaberrimum, foliis coriaceis elliptico-ovatis obovatis lanceolatisve acuminatis integerrimis serratisve, petiolis crassis, corymbo glaberrimo terminali paniculato pedunculato ramis crassis brachiatis paucifloris.—*V. Irabutha,* Blume MSS. in Herb. Hook.

Hab. In Montibus Khasia regione tropica; alt. 4000 ped.! *Griffith, Masters,* &c. (fl. Nov.) (v. v.)

Distr. China! Japan!

Frutex 6–10 pedalis. *Rami* robusti. *Folia* 4–6 unc. longa, valde coriacea, utrinque lævia, latitudine varia. *Corymbus* pyramidatus, 3–4-pollicaris, ramis patentibus, decussatis, crassis, angulatis. *Ovarium* glaberrimum. *Calycis* limbus cupularis, dilatatus, vix lobatus. *Corolla* parva, rotata. *Bacca* ovoidea, tumida; endocarpio sectione transversa reniformi-rotundato; seminis sectione cyclica.

11. VIBURNUM SIMONSII (*Hf. & T.*). Foliis glaberrimis ovato- v. elliptico-lanceolatis acuminatis supra medium serratis nervis numerosis parallelis, corymbo terminali longe pedunculato pubescente, ramulis floribusque bracteolatis.

Hab. In regionibus temperatis Montium Khasia, alt. 5000–7000 ped.! *Simons,* &c. (fl. Jun.) (v. v.)

Frutex v. arbuscula 8–15 ped., fœtens. *Folia* suberecta, 2–4 poll. longa, coriacea, utrinque lævia, viridia, petiolis rubris, nervis validis. *Corymbus* floridus subcontractus, fructifer glabratus, conicus, brachiatus, ramis angulatis decussatis sæpius rubris; bracteolis subulatis. *Ovarium* glabrum. *Calycis* lobi ovati, obtusi. *Corolla* parva. *Stylus* conicus; stigmate late capitato. *Bacca* oblonga, $\frac{1}{4}$ unc. longa; endocarpio sectione transversa late reniformi, sinu lato subquadrato.

D. *Corolla* tubo elongato cylindrico; limbo patente.

12. VIBURNUM ERUBESCENS (*Wall. Cat.* 459 & 7474). Foliis ovatis ovato-cordatis lanceolatisve acuminatis supra medium dentato-serratis nervis numerosis, corymbis paniculatis terminalibus lateralibusque nutantibus longe pedunculatis ramis bracteolatis.—*D.C. Prodr.* iv. 329.

Var. *α*. Foliis elliptico-oblongis acuminatis utrinque glaberrimis v. subtus pilosulis, paniculis glabratis.—*V. erubescens,* Wall. Cat. *l. c.*; Plant. As. Rar. ii. p. 29. t. 134.

Var. *β*. Foliis late ovato-cordatis acuminatis subtus pilis albis sparsis, paniculis glabris puberulisve.

Var. *γ*. Foliis late oblongis obtusis acutisve subtus pilosulis, paniculis puberulis.—*V. Wightianum,* Wall. Cat. 3729; Plant. As. Rar. ii. p. 29; Wt. & Arn. Prodr. 388; Wt. Ic. 1024, Spicil. t. 90.

Var. *δ*. Ramulis petiolis costis foliorum paniculisque dense stellatim tomentosis, foliis oblongo- v. elliptico-lanceolatis acuminatis, subtus ad nervos præcipue pubescentibus, pedunculo paniculæ crasso, ramis brevibus.

Var. ε. Foliis parvis (pollicaribus) late oblongis obtusis subtus paniculisque parvis pubescentibus.

Hab. Montibus Himalayæ temperatæ, alt. 5000–11,000 ped., a Bhotan! *Griffith,* ad Kumaon! *Blinkworth*; et Montibus Malabariæ, *Wight,* &c.; et Ceyloniæ, alt. 4000–5000 ped., *Gardner,* &c.—Var. *α.* in Nepal, Ceylon, Malabar, et Sikkim; var. *β.* Kumaon et Sikkim; var. *γ.* Malabar; var. δ. Sikkim, alt. 10,000 ped.; var. ε. Bhotan. (fl. Mart.–Mai.) (v. v.)

Species valde variabilis forma folii et indumento, sed habitu characteribusque certis facile recognoscenda.—Arbor parva, ramis sæpius gracilibus, foliis 1–4 poll. paniculisque pendulis nutantibusve operta. *Folia* utrinque viridia, nervis numerosis, axillis interdum barbatis. *Paniculæ* 1–4 unc. longæ, pedunculo gracili (in var. δ. robusto), pauci- v. multifloræ. *Flores* ½ unc. longi, ovario glaberrimo. *Calycis* lobi ovati, obtusi. *Corolla* tubo lobis ter longior, alba, straminea v. pallide rosea. *Bacca* parva, ovato-oblonga, endocarpio sectione transversa sublunato, sinu quadrato lato.

13. VIBURNUM NERVOSUM (*Don, Prodr.* 141). Foliis ellipticis oblongis lanceolatisve acuminatis serrulatis subtus petiolisque pubescenti-pilosis nervis numerosis parallelis, floribus præfoliaceis, corymbis brevibus sessilibus terminalibus erectis densifloris, bracteis tomentosis.—*D.C. Prodr.* iv. 327.—*V. grandiflorum,* Wall. Cat.

Valde affinis *V. fragrans,* Bunge, e China.

Hab. In Himalaya temperata et subalpina. Kumaon, alt. 10,000–12,000 ped.! *Blinkworth,* &c. Nepal! *Wallich.* Sikkim, alt. 11,000–13,000 ped, *J. D. H.* (fl. Mai.) (v. v.)

Frutex 3–6 pedalis, ramis robustis apice tantum foliiferis. *Folia* 3–4½ poll. longa, axillis nervorum sæpe barbatis. *Flores* albi v. rosei, odori, ¾ unc. longi, breve pedicellati, pedicellis ramisque inflorescentiæ robustis erectis patentim pilosis. *Corymbi* primum bracteis sericeo-tomentosis late ovatis tecti, ramis floribusque bracteolatis, bracteolis linearibus membranaceis. *Ovarium* glabrum. *Calycis* lobi breves, oblongi, obtusi. *Corollæ* tubus limbo quater longior. *Bacca* ⅓ unc. longa, oblonga, utrinque obtusa, compressa, endocarpio sectione transversa semicylindraceo; seminis sectione cyclico.

14. VIBURNUM FŒTENS (*Decaisne in Plant. Jacquem.* 75. t. 84). Foliis oblongis elliptico-lanceolatisve acuminatis serratis, glaberrimis puberulisve floribus præfoliaceis, corymbis terminalibus sessilibus glabris bracteolatis.

Hab. In Himalaya occidentali temperata, alt. 6000–10,000 ped. Kishtwar! Chamba! Kashmir! Marri! *Jacquemont, Fleming, T. T.* (fl. Mai. Jun.) (v. v.)

Omnia *V. nervosi,* sed paniculis foliis petiolisque fere glaberrimis, et inflorescentiæ ramis laxis v. effusis. *Flores* fœtidi (fid. *Jacquem.*). *Baccæ* ut in *V. nervoso* sed longiores, ¾ unc. longæ.

E. *Corolla* tubulosa, brevis, cylindrica, limbo non explanato.

15. VIBURNUM CORIACEUM (*Bl. Bijd.*). Foliis glaberrimis oblongis et oblongo-lanceolatis longe acuminatis integerrimis subtus pallidis glanduloso-punctulatis, corymbo terminali pedunculato glanduloso-puberulo, ovario verrucoso, corolla glabra.

Var. *α.* Foliis elongatis (4–6 poll.), nervis utrinque 3–5 margine subparallelis.—*V. cylindricum,* Ham. in Don Prodr. 142.

Var. *β.* Foliis elongatis (4 6 poll.), nervis utrinque costæ 4–8 divergentibus.—*V. Zeylanicum,* Gardner.

Var. *γ.* Foliis brevioribus (2–4 poll.), nervis utrinque costæ 3–7 margine subparallelis, corollis interdum puberulis.—*V. capitellatum,* Wight & Arn. Prodr. 1022.

Hab. Var. *α.* In Himalaya temperata, alt. 4000–7000 ped., a Sikkim! *J. D. H.,* ad Simla! *T. T.*; Montibus Khasia, alt. 5000–7000 ped.! *Lobb,* &c.—Var. *β.* Insula Ceylon! alt. 6000 ped., *Walker,* &c.—Var. *γ.* Montibus Malabariæ! *Wight,* &c. (fl. Nov.–Mai.) (v. v.)

Distr. Java!

Arbuscula 15–20 pedalis. *Folia* longitudine varia, plerumque integerrima, juniora interdum sinuato-dentata, coriacea, supra læte viridia, subtus subglauca, axillis nervorum interdum barbatis, basi rotundata, subcordata v. angustata. *Corymbi* subumbellati, multiflori, ramis ebracteolatis crassiusculis patentibus. *Flores* ¼ unc. longi. *Calycis* limbus breviter 5-lobus. *Corolla* lobis brevibus, obtusis, erectis; staminibus longe exsertis. *Baccæ* parvæ, ¼ unc. longæ, elliptico-oblongæ, compressæ; endocarpio hinc longitudinaliter 1-sulcato, illinc 2-sulcato.

16. VIBURNUM HEBANTHUM (*Wight & Arn. Prodr.* 388). Foliis glaberrimis elliptico-oblongis lanceolatisve acutis obscure dentatis, corymbo pedunculato terminali glabrato pedicellis bracteolatis floribusque dense glanduloso-pubescentibus.—*Wight, Ic.* 1023.—*V. pubigerum,* Wight & Arn. Prodr. 389?—An var. *V. coriacei?*

Hab. Montibus Malabariæ! *Wight,* &c. (fl. Mart.)

V. cylindrico simillimum, differt foliis obtusioribus subtus non aut vix punctatis puberulisve, pedicellis bracteolatis ovariis, corollisque dense pubescentibus.

VII. SAMBUCUS, *L.*

1. SAMBUCUS EBULUS (*Linn. Sp. Pl.* 385; *D.C. Prodr.* iv. 322). Herbacea, ramis sulcatis, stipulis sepius foliaceis, cyma obconica apice planiuscula.

Hab. In Himalaya occidentali temperata, alt. 6000–10,000 ped. Kishtwar! et Kashmir! *T. Thomson.* (fl. Apr.–Jun.) (v. v.)

Distr. Europa tota! Africa borealis! Caucasus! Asia Minor! Persia! Bacca interdum duplex et 6-pyrena.

2. Sambucus Javanica (*Reinw. in Blume, Bijd.* 657). Suffruticosa, ramis teretiusculis, stipulis rarius foliatis, cyma basi foliosa ramis patentibus elongatis, baccis nigris.—*D.C. Prodr.* iv. 322.

Hab. In Himalaya orientali subtropica, alt. 3000–6000 ped. Sikkim! *J. D. H.* In Montibus Khasia, alt. 4000–5000 ped.! Assam! *Masters*; *J. D. H. & T. T.* (fl. Jul. Aug.) (v. v.)

Distr. Java! China!

Foliola interdum 8–9 poll. longa, basi sessili adnata, v. petiolata, cuneata v. cordata.

3. Sambucus adnata (*Wall. Cat.* 482; *D.C. Prodr.* iv. 322). Suffruticosa, ramis sulcatis, stipulis rarius foliatis, cyma basi foliata ramis breviusculis, baccis rubris.

Hab. In Himalaya centrali et orientali temperata, alt. 6000–11,000 ped. Nepal! *Wallich.* Sikkim! *J. D. H.* (fl. Jun. Jul.) (v. v.)

Extract of a Letter from Mr. George Barter to R. Bentley, Esq., F.L.S. Communicated by Professor Bentley.

[Read February 4th, 1858.]

River Kworra, Sept. 29, 1857.

We have been now about three months in the river, laying down its course, sounding, surveying creeks and confluents, and making short journeys overland wherever the nature of the country or its inhabitants permitted. This place, Rabba, is the limit of former explorations, hence ours may be said only to commence from here; in the meantime another large confluent to the Kworra has been discovered, but for several reasons not explored beyond three days' steaming up it. The intended overland journey to Soccatoo will be delayed till the rains cease, but the steamer will be pushed up this river as far as it proves navigable, if the rocks at Boussa, reported to be an obstacle to further progress, can be passed; then perhaps Timbuctoo itself may be reached by Christmas.

In botany I perhaps have made some additions, to the river flora more especially; altogether my numbered list now amounts to 1300 specimens, collected on the coast and in the river, besides various specimens of woods, fruits, &c.; but in a small, overcrowded steamer like this, where half of us have not even a cabin to sleep in, you will imagine many obstacles to plant-preserving: damp below, violent rains and wind-tornadoes on deck, destroy sometimes the work of weeks: we have not on board a tinned box, or indeed anything to make a water-tight case to put dried plants in.

In the lower parts of the river, till some distance beyond Abo, a rich vegetation is prevalent: Oil and Wine Palms abound; lofty forest trees, for the most part unknown to me, grow together so thickly at their summit, that the light is almost shut out below; trees overhanging the water were observed in this moist region covered with *Orchideæ*, principally of the genera *Angræcum* and *Bolbophyllum*; Ferns, as epiphytes, are also abundant. *Platycerium Stemaria* is on every tree. We however passed so quickly through these parts, that I had few opportunities of landing, therefore did little botanizing. Further up, where the country becomes picturesque, with hills and low mountains, these extensive forests disappear, and the air is drier; the Wine Palm is replaced by the Fan Palm; Oil Palms are still abundant, but less luxuriant; the huge *Bombax* with its laminated trunk gives place to the unsightly *Baobab*. The low mountains have all flat tops, seldom over 2000 feet high, therefore yielding few novelties; the sides of these are frequently bare, composed of sandstone or coarse iron conglomerate. The land from eighty miles below the confluence, to Rabba, wherever we have penetrated any distance, is of a sandy character mixed with iron, therefore not fertile; but it appears to be the true region of *Bassia Parkii*, or the Butter-tree, which occupies extensive tracts; it is a low scrubby tree, seldom more than 15 or 20 feet high, producing its long leaves on the extremities of the branches: the quantity of the butter offered us for sale would have filled a large ship. On some mountains lately visited on the Kworra I have gathered plants resembling the Cape vegetation, viz. *Proteas*, *Aloes*, *Lobelias*, *Brachystelma*, *Ixias*, *Nycterinias*, &c. I anticipate much novelty should we reach any of greater elevation. A low belt of ground always borders the river; in general this is swampy, covered with tall grasses, among which a beautiful *Gynerium* is now in flower; it seems identical with the *G. argenteum* of our gardens at home.

To the Palms of Africa I have at least added four undescribed species: one like *Geonoma*, the others *Calami*; probably many of the latter yet exist in the delta. I am not sure if the Fan Palm is known by specimens: near the river it is scattered along singly, generally at intervals one or two miles apart; only once have we seen them gregarious, on some mountains up the Kworra twelve miles from the confluence: it does not form a large head; the leaf-petioles are short; the trunk sometimes 60 feet high, always of greatest diameter in the middle; so conspicuous is this, that it destroys all pretensions to beauty. The Oil Palm, which I believe is somewhere so figured, never approaches this form,—a small stem tapering from the base being universal with *Elæis.* On the disputed point—the sexes of *Elæis,*—the evidence gathered confirms the truth of Brown's statement: *both sexes occur on one tree,* although in most plants the sexes are on different trees: the plant producing *male flowers only,* is the one alone pierced for making wine. Plants having reputed medicinal properties are so common in use among the natives that I have ceased to pay much attention to them; nearly all which grow round their towns are used for some amazing virtue. A species of *Balanophorea, Thonningia sanguinea,* which I was requested to look after by Dr. Hooker, appears useful in dysentery, being used by several nations: it is a rare plant, but frequently seen exposed for sale in the markets; I have met with it but once, growing on the roots of a *Bauhinia,* its fine crimson flowers just appearing above the sand. Among many interesting fruits gathered is a species of gigantic Bread-fruit,—an *Artocarpus,* mentioned by Dr. Vogel as growing about the confluence; it is a large tree, 60 to 80 feet high, with smooth whitish bark yielding a milky juice, leaves ovate acuminate, shining and coriaceous: the fruit of this is said to weigh sometimes 30 lbs.; specimens which I have preserved are over 17 lbs., though many larger ones could have been obtained, had space allowed; seeds of this are about the size of small kidney beans, and form an important article of food to the natives; in the woods near the Model Farm this tree is most abundant. On one occasion, when botanizing there after rain, the sun shone out fiercely, loosening the hold of these fruits: the sound of their fall, as they crashed through the branches, was continuous throughout the afternoon, like the passing of large animals. Several kinds of *Anonas* and *Artabotrys* abound: the fruit of one of these is almost equal in flavour to an English apricot. Ferns have become very rare now, and epiphytic Orchids not any. Aquatic plants are not numerous. *Nymphæa dentata, Ceratopteris thalictroides, Pistia Stratiotes, Salvinia,* a species of floating plant* (the latter is very beautiful, and will, if I can bring it home, be an interesting addition to the aquarium), *Chara,* sp., and two kinds of *Utricularia,* are forms of much interest. Several *Cyperaceæ,* a *Polygonum, Alisma sagittifolium, Jussiæa,* sp., with some other *Onagraceæ,* occupy most of the swampy lagoons. Inland from the river, *Leguminosæ* are well represented; I have probably nearly 100 species of this family. *Polygaleæ* are beginning to appear; eight or nine species of the genus *Polygala* occur about Rabba. The curious cucumber-like fruit of two species of *Kigelia* overhang the river banks; specimens of each are, I believe, already in the Kew Museum; but the glory of this family is a large-growing *Spathodea*, now covered with flowers as large as the hand, and of a colour only equalled by *Rhododendron javanicum*. *Rubiaceæ* are abundant; many handsome shrubs deserving of cultivation occur in this order. *Sapotaceæ* are numerous as trees, and the *Ficus* tribe are found everywhere.

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* A specimen enclosed in the Letter shows this to be an *Azolla.*—SECR.

Of the little-known Guinea-Peach, *Sarcocephalus esculentus*, I have both flowers and fruit preserved; the latter is fine-looking, but not very palatable. Of other edible fruits, some species of *Spondias* are not amiss; while about seven distinct fruits, known as "plums," are also eaten. At Idda we purchased fruit of a kind of Mango; the tree producing this could not be seen, but I have preserved several species.

Of all fibres, gums, dyes, cottons, or manufactured articles, I have procured specimens for the Museum at the Botanic Gardens, likewise of woods or fruits, whenever space will allow: none of these can be sent to England till we return. According to present arrangements, I shall probably be rather longer engaged than the term of my appointment indicated when leaving home, a voyage up the Chadda being spoken of when we return down the Kworra; but unless much improvement takes place in the health of our party, very few I believe will care for another year on an African river.

In this note I have merely given a rough outline of the vegetation, in an unconnected form; it is written hastily in consequence of our starting some hours earlier than I expected, therefore much is omitted.

On the Question whether Linnæus, in a spirit of ill-will, altered the spelling of the name of the genus *Buffonia*? By Mons. A. L. A. Fée, Professor of Botany of the Faculty of Medicine at Strasburg. Communicated by Thomas Moore, Esq., F.L.S.*

[Read February 4th, 1858.]

The genus *Buffonia*, of the family of *Caryophylleæ*, the type of which is *Buffonia tenuifolia*, remarkable for the facility with which the stamina vary in number, being sometimes reduced to two, and sometimes increased to eight, has been variously spelled, authors either admitting or not admitting the doubling of the *f*. We are about to show how this has occurred.

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* Translated from the French.

Although several botanists, even among contemporaries, have attributed this genus to Linnæus, it is certain that it belongs to Sauvages. What may have led to this mistake is, that the first official mention of the genus is found in the first volume of the 'Amœnitates Academicæ,' page 386, under the year 1749, in a thesis of Dassow, maintained under the presidency of Linnæus on the 12th of June 1747, and that the generic characters are there given, for the first time, four years before Sauvages himself published them. In this Thesis we read, "*Bufonia, auctore Sauvages*;" it should have been added, "*in litteris ad Linnæum.*"

The correspondence of these two illustrious men lasted for no less than eight-and-twenty years: it commenced on the 20th of January 1737, and terminated on the 3rd of May 1765, about eighteen months before the death of Sauvages. The letters, forty-three in number, are now in the possession of M. d'Hombre-Firmas, of Alais, grand-nephew of the celebrated Professor of Montpellier, who has long had the intention of publishing them. They are interesting, and I have been permitted to satisfy myself that they do not enable us to determine the precise date of the creation of the genus *Buffonia*. Nevertheless they contain the proof that it is anterior to 1745, inasmuch as in a letter of the 15th of October of that year, Linnæus says that the flower is tetrandrous, and that he will make sure of this on more perfect specimens, his own being incomplete; and long afterwards, in Letter XIX., of the 20th of August 1753, he begs Sauvages to settle his doubts on this point: "*quæso etiam hac æstate examines stamina Buffoniæ; Lœflingius scribit* 4 *esse in singulo flore.*"

It thus becomes perfectly certain that Sauvages, before definitively constituting the genus *Buffonia*, referred it in 1743 or 1744 to Linnæus, towards whom at that time converged all discoveries of interest in natural history. Linnæus and Dassow having written *Bufonia*, we may be allowed to believe that Sauvages wrote the name in the same manner in his correspondence.

The typical species of this genus, although (contrary to the statement of certain authors) a native of dry and sandy soil, bears an astonishing resemblance to *Juncus bufonius* of our marshes, and Linnæus may have supposed that the generic name was destined to recall this external analogy, being ignorant of the naturalist to whom the genus was dedicated. Had Sauvages written *Buffonia*, he would have remarked that Linnæus, in his letter of the 15th of October 1745, had mis-spelt the name, and Linnæus, thus warned, would have rectified it in his letter of the 20th of August 1747. Not only is this not done, but we shall see that the Montpellier botanist himself gives an official consecration to the error, in complete disagreement with the etymology.

The 'Methodus Foliorum, seu Plantæ Floræ Monspeliensis,' a remarkably curious work, published at the Hague in 1751, gives the generic characters of *Buffonia*, followed at p. 141 by these words, "dicata illustrissimo Horti Regii Parisiensis Præfecto, et Acad. Regiæ Scient. Paris. Sodali D. de Buffon;" and by a singularity not easily to be accounted for, Sauvages prints, or allows to be printed, *Bufonia* in his text, while in the index he places *Buffonia*, without indicating that it is the correction of a mistake. More than this, after the generic name he adds an *L.*, as if Linnæus were the founder of the genus. Thus we have a justification for those botanists who attribute the genus *Buffonia* to Linnæus; and thus we can explain how it has happened that Linnæus, in the "legal" edition of his 'Species Plantarum,' 1764, Lamarck in 1783, in the first volume of the 'Encyclopédie Méthodique,' Gærtner in 1787, in his work 'De Fructibus*,' Jussieu in his 'Genera Plantarum,' 1789, and a multitude of other authors, have written the name *Bufonia*, in submission to the text of Sauvages and to that of the 'Amœnitates.'

It evidently results victoriously from the preceding exposition that the alteration of the generic name *Buffonia*, by the suppression of one of the *f*'s, cannot be in any respect attributed to Linnæus, but to Sauvages himself, and thus are annihilated all assertions to the contrary, made in a multitude of books, which have found credulous readers, who perhaps were not displeased to discover in a great man, in spite of their esteem for him, what they regarded as a weakness. Nevertheless, to render the justification, if possible, still more complete, let us admit for an instant that Linnæus was desirous of making an unworthy approximation between an illustrious adversary and a filthy animal. Every action having an object, let us ask ourselves what could be Linnæus's object in so doing? "He wished," it may be said, "to avenge himself on Buffon, who had combated his ideas of reform." Who can think thus of a man, who up to that time was ignorant even of the name of his future adversary, occupied till then only with geometry, physics, and rural economy, works doubtless of some importance, as they obtained for him admission into the Academy of Sciences as early as 1733? The printing of Buffon's 'Histoire Naturelle' extended from 1749 to 1767, and it was during this interval that the reputation of Buffon was diffused and popularized. If this great man was known in Sweden prior to this epoch, it was not by Linnæus. Revenge can only be taken for an actual injury, and Linnæus had no reason to complain of attacks which had never taken place. We may here invoke a material impossibility—a sort of *alibi*. It is a petty calumny directed at one and the same time against two great names. We may consequently say with Richter (Opera Omnia Linneana, 1836), "Nomen iniqua mente a Linnæo in *Bufoniam* (pro *Buffonia*) mutatum esse, probent ii qui narrant."

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* Gærtner, it should be observed, spells the name with the double *ff*, quoting "*Bufonia*, L." as a synonym.—J. J. B.

Linnæus had his adversaries, and what man of genius has not? But in his writings we should seek in vain for traces of ill-temper. He had an elevated tone of thought, an excellent heart, and great dignity of character. He was, if I may be pardoned the expression, a very good great man. Controversy was his antipathy; he thought, not without reason, that his time was better employed in improving former publications and preparing new ones; and this was the wisest mode of reply. He not only disliked, but he feared, scientific polemics. The proofs of this assertion are as numerous as they are convincing. He answered neither Heister, nor Siegesbeck, nor Browallius, nor any other opponent. "My old friend Ludwig," he writes to Haller, "wishes to attack me, and I shall be easily conquered, for I lay down my arms beforehand. I will not defend myself." Having reason to complain of Haller, who had greatly ill-used him, he wrote thus in his 'Flora Zeylanica':—"In Germania inter Helvetos eminet alter Boerhaavius Hallerus. Cl. Hallerum esse mortalium omnium laboriosissimum, inque Theoria Medica et Anatomia hodie summum, norunt omnes. In Botanicis insuper plures investigavit et descripsit plantas quam ullus facile alius. Inique itaque dixere nonnulli me minus mite de viro optimo scripsisse; et sciant velim me ejus scripta et observationes ubique magni facere et attente volvere, cum in tota Germania vix adhuc alius meliora præstiterit."

All reformers are heated and intolerant. Linnæus was an exception; he was mild and benevolent. It has been written, and I have myself repeated it*, that he dedicated to antagonists plants of an ungraceful habit, thorny, or singular in some of their parts. This might possibly have been so, and there would have been no great harm in it; nevertheless *Siegesbeckia orientalis*, which recalls the name of one of his most furious antagonists, is a very beautiful *Composita*; and one of the largest trees in creation is dedicated to the memory of Adanson, a reformer who wished to reform *alone*. Linnæus knew neither envy nor hatred, and showed himself satisfied with the share of esteem and of renown which he had conquered. I have said elsewhere*, that on being made acquainted with the injurious intentions with reference to Buffon attributed to him by his enemies, he was indignant at the imputation.

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* See my 'Vie de Linné,' p. 120, *et seq.*

And what has happened to those who attacked Linnæus? Those who founded on these attacks a hope of fame, have been forgotten; while the opposition of those whose labours have deserved well of posterity is no longer remembered; what they did for science alone remains standing. Time, that great "justicer," puts everything in its proper place, and leaves on the head of genius the imperishable crown, from which the envious have laboured in vain to tear away some of the jewels.

Buffon certainly, glorious and honoured, could have no envy towards Linnæus; but how much preferable would it have been, could he have refrained from writing against that ingenious reformer! Not only was his logic at fault, but even his science. For example, while blaming the construction of the class *Mammalia*, now universally adopted, he ought not to have said that it had been known since the time of Aristotle† that the Horse has no mammæ, and he ought not to have concluded from this that the Horse is an exception among Mammalia‡.

Let us go no farther; if to blame is easy, let us not forget that it has its dangerous side, and let us abstain from touching one of the greatest of our national glories. Let us be satisfied with having contributed to efface the slight spot which had been thought to tarnish the brilliancy of a justly venerated name, that of a man who by his genius has deserved to obtain the right of citizenship in every country of the civilized world.

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* 'Vie de Linné,' p. 287.

† *Τὰ δὲ μωνύχων τὰ ἄῤῥενα οὐκ ἔχουσι μαστοὺς πλὴν ὅσα ἐοίκασι τῇ μητρὶ, ὅπερ συμβαίνει ἐπὶ τὸν ἵππον.* "In the Class of *Solipeda* the males have no mammæ, except in some individuals which resemble their mother: this is met with among horses" (Aristotle, lib. ii. 8). Thus Aristotle only says that the presence of mammæ in the Class of *Solipeda* is not universal, which, although false, is less absolute than what Buffon says.

‡ Buffon, Histoire Naturelle, 1749, i. p. 38 (Sur la Manière d'écrire l'Histoire Naturelle).

Note on the preceding Communication.

By John J. Bennett, Esq., F.R.S., Sec. L.S.

[Read February 4th, 1858.]

Since the receipt of M. Fée's paper, I have carefully examined Sauvages's Letters to Linnæus, preserved among the Linnean Correspondence in the Society's Library, and have found in them several passages entirely confirmatory of M. Fée's conclusions, although they invalidate the force of some of his arguments.

The first of these passages is contained in a letter from Sauvages dated Sept. 14th, 1745, in which the learned Professor of Montpellier transcribes for Linnæus his characters of the genus "Buffonia, in honorem D. de Buffon, Ac. Reg. Par." In a subsequent letter, under the date of October 26th in the same year, he supplies an amended character of *Buffonia*, on which Linnæus has noted in the margin "optime." Sauvages adds:—"hanc mihi communicavit Medicinæ studiosus D. Marchant oculatissimus." He transmits a specimen, and adds, "Ignosce, quæso, colendissime amice, si coram te plantam novo nomine generico indigitare ausim: hoc me judicio subjicio; tuum est mea omnia emendare." The Dissertation in which Linnæus first published the genus "Bufonia. *Autore Fr. de Sauvages*" bears date June 15th, 1747, and in a letter of the date of Sept. 15th, 1747, after hearing of this publication, Sauvages has the following passage, which is conclusive as to the *animus* both of Linnæus and himself in regard to Buffon:—"Pergratum et mihi et Ill° D. de Buffon, horti Reg. Paris. Præfecto, et Academiæ Parisinæ Socio meritissimo, videbitur, quod nomen illius generi novo plantæ cujusdam inditum fuerit et sic immortalitati consecratum: cum primum hic liber [Dissertatio nempe resp. Dassow, "Nova Plantarum Genera"] Lutetiam appulerit, scribam ad Ill. Buffon ut tua et mea erga ipsum officia extollam." The only other reference to the subject that I can find in the Letters is under date of Sept. 13th, 1753, where, in answer to Linnæus's statement of Lœfling's observation that he found four stamina in each flower, Sauvages says, "*Buffonia* rite examinata est diandra; utrum variet inter Hispanos nescio. Mitto semina ut ipse videas." Throughout the whole of Sauvages's letters the name is spelled correctly with the double *ff*; and it is only in the body of his work that Sauvages has (inadvertently, as his index shows) adopted the erroneous spelling.

The name thus mis-spelt was published by Linnæus in 1747, and it was not until 1749, as M. Fée justly remarks, that the offence which it has been supposed to be intended to avenge, was given to Linnæus and all other "methodists" in the preface to Buffon's great work, commenced in that year. That Sauvages at least felt this offence strongly will be seen by the following extracts from his letters; but that this feeling could not have influenced either him or Linnæus two years before the offence was given, is equally manifest. In a letter bearing date April 3rd, 1750, after referring to the attacks of Lametrie and others, Sauvages proceeds as follows:—"Alterius certe ordinis sunt censores quos in te nuper insurgere intelligo; scil. D. Daubenton, vel de Buffon, in *Historia Naturali Universali*, quam recens edidit, et quam nondum vidi, et D. Heister in altero opusculo in quo nomenclaturæ plantarum leges novas protulit. Primus, seu D. de Buffon, quod miror maxime, omnes methodos improbat, et contendit facilius citiusque addisci historiam animalium, plantarum, &c. in individuis quam in specificis genericisque descriptionibus. Anne umquam putasses quod tam absona absurda opinio in animalis rationalis mentem venire potuisset? Hoc tamen ad me scribunt, unde non doleo quod a te recedit qui a ratione tam alienus est." And in a letter of November 15th, 1751, he continues in the same strain, referring to the Epistle to Linnæus prefixed to his own 'Methodus Foliorum,' then just published. "Videbis," he says, "quomodo paucis confutem D. Buffonem, qui existimat, mirum dictu, sine ulla methodo addiscendam esse et docendam historiam naturalem, quod certe numquam in mentem cordati hominis venerat. Malo, certe, te ab homine ita transverse cogitante carptum esse quam laudatum. Decorum etenim est illis displicere quibus ipsa ratio displicet."

The charge of mis-spelling the generic name of *Buffonia* from pique or malice having fallen completely to the ground, it may be worth while also to correct an error in regard to the specific name, to which no less an authority than that of our distinguished founder, Sir James Edward Smith, has been given in the following passage of his 'English Flora':—"Sauvages named this genus after his great countryman Buffon, who had indeed very *slender* pretensions to a botanical honour; a circumstance supposed to have been indicated by Linnæus in the specific name *tenuifolia*." A reference to the synonymy of the plant is all that is needed to show, that in this instance Linnæus simply adhered to his usual custom of adopting for his specific name, wherever practicable, a characteristic portion of the name by which it had been previously known. In this case he found a specific name admirably adapted to the plant in the "Alsine polygonoides *tenuifolia*," &c. of Plukenet, and adopted it without hesitation.

M. Fée states the number of Linnæus's letters to Sauvages, in the possession of the Baron d'Hombre-Firmas, to be 43, commencing January 20th, 1737, and ending May 3rd, 1765. Those of Sauvages to Linnæus, in the possession of the Linnean Society, are 63 in number, commencing Sept. 10th, 1737, and terminating April 7th, 1765. From a reference to it in Sauvages's second letter, it would appear that Linnæus's first to him bears date on the 20th of *June*, and not of *January*, 1737; a mistake which might easily arise between the contracted forms of "*Jan.*" and "*Jun.*" The whole series of Sauvages's letters contains much interesting information, relating not only to the state of botanical and medical science, but also to the personal history and character of the professors of both.

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